A GRADED COURSE OF GEOGRAPHY

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BOOK III—THIRD YEAR

OCEANS, INDUSTRY, TRADE

NORTH AMERICA, BRITISH ISLES

BY

E. S. PRICE

GEOGRAPHY MASTER, RUABON GRAMMAR SCHOOL
CHIEF EXAMINER IN GEOGRAPHY TO THE JOINT MATRICULATION BOARD

PART I

NORTH AMERICA

ILLUSTRATED BY EIGHTY-FOUR MAPS AND DIAGRAMS

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BOOK III—THIRD YEAR
OCEANS, INDUSTRY, TRADE
NORTH AMERICA, BRITISH ISLES

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LIVERPOOL : PHILIP, SON & NEPHEW, LTD., 20 CHURCH STREET

1927

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GENERAL PREFACE

THE four books, of which the present volume is the third, form the basis of the four years' course in Geography which is in operation at one of the two schools receiving a special geography grant from the Board of Education.

In deciding to add yet another series of geography books to the number already available, the author was influenced partly by the opinions of inspectors and other experts who visited the school, and partly by the experience gained as lecturer on the teaching of geography at different summer schools, where manuscript copies of the work have been examined by hundreds of teachers.

The distinguishing features of the present course are:

(1) Educationally, geography is regarded as a practical science, therefore great prominence is given to individual work of a kind intended to stimulate the pupil's self-activity. The practical exercises have been framed to lead the pupil to discover and apply geographical laws and principles.

(2) The selection of descriptive matter, and the mode of presenting it, is entirely in the hands of the teacher, who is free to follow his own inclinations.

(3) The special educational value of geography in linking together other studies is recognised, and useful connections are established between the various subjects of the curriculum.

(4) The books cannot be used independently of the teacher. They are not text-books. The pupil's text-book is his own notebook.

The course is intended for pupils between 12 or 13 and 16 years of age, and covers the outlines of the geography of the world by a successive treatment of the continents, which are dealt with in the following order:

Book I.—South America.

Book II.—Australia and Africa.

Book III.—North America and the British Isles.

Book IV.—Eurasia and revision.

This order of treatment was chosen because of the order in which the main principles of physical and human geography are emphasised. In the first year of the course the emphasis is laid upon climate and vegetation. In the second year the emphasis is upon land forms and the sculpturing agents. In the third year the emphasis is upon industries and trade. A simple geological map of the British Isles is introduced at this stage.

The principles established in the first year are reviewed and amplified as the course advances, and new topics are illustrated by examples drawn not only from the special regions which are under consideration, but also from regions already dealt with. Thus past work is constantly revised, and the pupil is led to realise that geographical principles are world-wide in their application, and this prepares him for the fourth year of the course, when he surveys the world with natural regions as units.

The success of the course depends largely upon the use which is made of local material. It cannot be too strongly urged that the pupil's mind should be brought into contact with actual facts. Direct observation of the physical conditions and human activities of the school district is essential for providing the imagination of the pupil with material for constructing pictures of conditions in other lands. These mental pictures should be expanded and corrected by means of pictures, lantern slides, and models.

The writer desires to record his great indebtedness to Prof. Fleure of the University of Wales, Aberystwyth, and to W. Hammond Robinson, Esq., M.A., Inspector to the C.W.B., for constant inspiration and encouragement.

In planning the present course, he has derived considerable help from the numerous geography books which have been published during recent years.

E. S. PRICE.

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PREFACE TO BOOK III

THIS book, which provides the basis for the work of the third year of the course, is divided into two parts, Part I dealing with North America and Part II with the British Isles.

The same order of treatment is followed as in the other books of the series, and particular care has been taken to arrange the work in such a way as to enable the pupil to discover the causes of, and the principles underlying important geographical facts.

The exercises marked A, F, H., etc., should form part of the course to which each letter refers. Exercises prefixed by an asterisk are to be answered as a result of lessons given in class, or as a result of independent reading. In the latter case it is suggested that the teacher should draw up a list of the available books containing the information required for answering the questions; in the case of a book which is not well indexed, the chapter and page should be given as well as the title.

It is not suggested that all the exercises should be worked by every pupil who uses this book. As circumstances vary from school to school, the teacher concerned must decide which exercises, if any, are to be omitted. Care, however, must be taken that the omissions do not cause gaps which destroy the continuity of the course.

The pupil should be warned against believing that all that is required of him is to work the exercises correctly. The facts and principles established must be thoroughly understood and mastered as the work proceeds, for only in this way does he acquire the store of knowledge necessary for solving later exercises.

The hearty thanks of the author are again due to Mr. W. E. Whitehouse, M.Sc., of Aberystwyth University, for his valuable suggestions and for revising the manuscript.

E. S. PRICE.

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A GRADED COURSE OF GEOGRAPHY

BOOK III

THIRD YEAR

CHAPTER I

NORTH AMERICA

POSITION, SIZE, SHAPE, TIME BELTS

1. NORTH AMERICA, discovered in 1492, is one of the most important of the continents. Its rapid development, as compared with that of South America, is primarily due to its position.

Notice the position of North America on a globe, its extent in latitude, its relation to the other continents and to the oceans. With the help of the globe and an atlas find the details (distances, town names) required to complete Fig. 1. Enter the facts upon a tracing of the map.

2. Copy the outline of Fig. 40 on squared paper. Mark also (*a*) the boundaries of Alaska, Canada, United States, and Mexico; (*b*) parallels of latitude 35° N. and 55° N.

Calculate (*a*) what percentage of the mainland lies between parallels of latitude 35° N. and 55° N.; (*b*) what percentages of the area thus determined belong to Canada, to the United States, and to Mexico.

3. Generally speaking, the regions best fitted for European settlement lie between latitudes 35° and 55°. Give reasons for this.

4. Draw four rectangles to the same scale, as illustrated in Figs. 62 and 63, to represent the following areas:

	sq. miles.
North America . .	8,000,000
South America . .	6,800,000
Africa	11,500,000
Australia . . .	2,975,000

Mark off in the respective rectangles, divisions to represent the areas of Canada, United States, Mexico; Brazil, Argentine; Union of South Africa; and the several States of Australia.

5. Use a globe to find (*a*) the distance from Winnipeg to Vancouver and Quebec; (*b*) the distance from Chicago to New York, San Francisco, and New Orleans; (*c*) the width of the continent in latitudes 55°, 40°, and 23½°; (*d*) the distance from Hudson Bay to the Gulf of Mexico along the 90th meridian.

6. On an outline map of North America mark the results obtained in answer to question 5. Mark also the names of the chief straits, bays, and gulfs.

7. Write a summary of what you have learned from your answers to the foregoing questions, as to the position, size, and shape of North America.

8. In order to find the position, size, and shape of North America you were requested to use the globe and not the atlas. A comparison of different maps of the continent will enable you to discover the reason for this. Compare the shape of North America in Fig. 1 with the shape of the continent in Figs. 40 and 3. What do you notice? These differences are very important, and unless they are taken into account it is possible to form erroneous ideas of direction, shape, and size.

9. Let us interrupt our study of North America for a while to see if we can understand why maps of the same continent do not always have the same shape. It is impossible to draw a map of a continent upon a flat surface without giving to some parts of it either the wrong shape or wrong size, or both wrong shape and wrong size. Why?

On most of the maps in your atlas you will find a network of parallels and meridians. You have already learned how to draw such a network upon a globe. It is not an easy matter to transfer the network from the globe to a flat

Arctic Current
Labrador Current
Gulf Stream
Canaries C.
N. Equatorial Current
S. Equatorial Current
Counter Current
Brazil Current
Benguela C.
Peruvian C.
Limit of Drift Ice.
Sargasso Sea
A
B
C
D
a miles
b miles
c miles
d miles
e miles
Californian Current
Kuro Siwo
Shanghai
Hawaii Is.
West Wind Drift
Aleutian Is.
INTERNATIONAL DATE LINE
Northern Equatorial Current
Marshall Is.
Gilbert Is.
Solomon Is
Samoa Is.
Fiji
New Caledonia
E. Australian C.
W. Australian Cur.
Limit of Drift Ice
Westerly Wind Drift

FIG. 1.

surface. Several methods have been devised for doing this, each of which produces a different kind of network, or **projection.**

Compare the projection of Fig. 1 with those of Figs. 40 and 3. In what respects do they differ? Compare each map with the globe, and state how each projection affects the shape and relative areas of different parts of the continent.

10. You have learned that the true north and south line at any place lies along the meridian which passes through that place, and that the east and west line lies at right angles to the north and south line. Which of the projections referred to in question 9 has parallels and meridians at right angles? State what you notice with regard to these on Fig. 40 from the centre of the map outwards.

11. Place a sheet of tracing paper over the political map of North America in your atlas and trace upon it the outline of the continent and the network of parallels and meridians. Remove your tracing, and without consulting the map mark upon your traced outline the position of the following towns, whose latitude and longitude you will find in the index to any well-arranged atlas: Philadelphia, Boston, Hamilton, Pittsburg, St. Louis, Memphis, Mexico City, Denver, Edmonton, Los Angelos, Regina, Galveston. Check your work by replacing your tracing over the map in the atlas.

12. You already know how to find the longitude of your school town. If you were at New York and had a knowledge of Greenwich time, when the New York clocks showed noon how would you determine roughly the longitude of New York?

13. One result of the great width of North America in middle latitudes is the marked difference between the local times of many important American cities. What is the local time at San Francisco when it is noon at New York?

You know that in Britain all clocks are set to Greenwich time. State how confusion would arise if every American city kept its own local time. In order to avoid such confusion Canada and the United States have been divided into **time belts.** Within each belt all clocks show the same time. The name given to each belt is found on Fig. 2. Suggest reasons for the irregular boundaries of the belts. Which meridian has been chosen as the standard for each belt?

Fig. 2.

14. What time does a clock at each of the following towns show when a clock at Halifax (Nova Scotia) shows 1 p.m.: Baltimore, St. Paul, Sacramento, Salt Lake City?

15. Use a globe and lamp to illustrate the fact that if a traveller goes round the world westwards without altering his watch he loses a day, whilst if his journey is eastwards he gains a day.

F. 16. Translate:

Le voyageur, qui fait le tour de la terre en s'avançant vers l'ouest, s'il ne règle pas sa montre, finit par compter des heures de plus en plus en avance sur les heures vraies des pays où il passe. C'est ce qui est arrivé aux équipages de Magellan, au retour de leur voyage de circumnavigation: le jour de leur retour était pour eux, d'après le nombre de levers et de couchers du soleil auxquels ils avaient assisté, le 5 septembre 1522, tandis que les habitants de la ville comptaient le 6. S'ils avaient fait leur voyage dans le sens opposé, et dans le même temps, le jour de leur retour auraient été pour eux le 7 septembre.

Note the particular use made of this information in Jules Verne's book, *Round the World in Eighty Days.*

17. What is meant by the "International Date Line?" Why is such a line necessary? With the help of Fig. 1 and of your atlas, describe its course. Where does it deviate from the 180th meridian? Give reasons for the deviations.

CHAPTER II

RELIEF, AND STRUCTURAL DIVISIONS

1. FIG. 3 is a key to the relief map of North America. The position and direction of the chief mountain ranges are shown by thick black lines. The 1,200-ft. contour line is also shown. Colour the land below 1,200 ft. green and above 1,200 ft. yellow.

2. Turn to the orographical map in your atlas. Notice that North and Central America may be divided into five regions: (*a*) **Western Highlands,** a region of high mountain ranges and plateaus, extending from Alaska to the Isthmus of Tehuantepec; (*b*) **Eastern Highlands,** much lower and less extensive than the Western Highlands, stretching from Alabama to Labrador and Newfoundland; (*c*) **Central Lowlands,** extending from the Arctic to the Gulf of Mexico; (*d*) **Atlantic Coastal Plain**, lying to the east of the Eastern Highlands and extending from New York to Florida; (*e*) **Highlands of Central America.**

3. Mark the above regions on an outline map and compare your map with Fig. 34, which shows the structural divisions. Notice that according to structure the Central Lowlands are divided into two parts. Describe the course of the line which separates the northern "peneplain" from the young sedimentary plains.

4. You are already familiar with some of the characteristic features of each structural division, and several of the land forms named in the following questions are familiar to you: others will be discussed in the next chapter.

Draw up a table to show the structural divisions and the corresponding physical divisions in North America, South America, Africa, and Australasia, respectively (see Book II, Fig. 91).

5. Use layer tints on Fig. 4 to show the general character of the relief. Draw a section from A to B Measure the width of the land exceeding 3,000 ft. altitude shown by your section. With the help of your atlas and of the key map (Fig. 3) enter the names of the rivers, lakes, plateaus, and mountain ranges upon the map.

6. Read selected first-hand descriptions of the scenery of parts of the region covered by Fig. 4, and enter into your notebook any interesting facts to supplement the following outline of the main features of the region:

Western Mountain Region

In Alaska and Yukon, the Western Mountain region consists of:

(*a*) The Endicott Range, sloping gradually to the Arctic Ocean.

(*b*) The Yukon Plateau, deeply dissected by the Yukon River and its tributaries.

(*c*) The Alaskan Range, with many volcanoes, including Mount McKinley—the highest peak in North America.

(*d*) The Coast Range, running westwards from the St. Elias Alps to the volcanic Aleutian Peninsula and islands.

Enormous glaciers in this region extend to the sea.

In British Columbia the region consists of:

(*a*) The Rocky Mountains, which rise steeply from the plains and foothills of Alberta. Here there are more than twenty peaks over 10,000 ft. high.

(*b*) A remarkable **longitudinal valley,** which runs for 800 miles parallel to the main ranges of the Rocky Mountains. Rivers from the Rocky Mountains, fed by extensive glaciers, bring an enormous quantity of rock waste into the valley.

(*c*) The Selkirk and Gold Ranges separated by a longitudinal valley which contains long narrow lakes.

(*d*) The British Columbia Plateau, containing many valleys, some of which are broad and very fertile. The Fraser and Thompson Rivers have cut deep valleys in the plateau.

(*e*) The Coast Range, whose western valleys have been deepened by glaciers and invaded by the sea. The Fraser and Skeena Rivers have cut **transverse valleys** across the range.

(*f*) A series of islands, including Vancouver Island and Queen Charlotte Island. These islands are the remains of a mountain range which has been submerged.

7. Apply question 5 to Figs. 5, 6, and 7. The outline of the relief features of the continent is continued below:

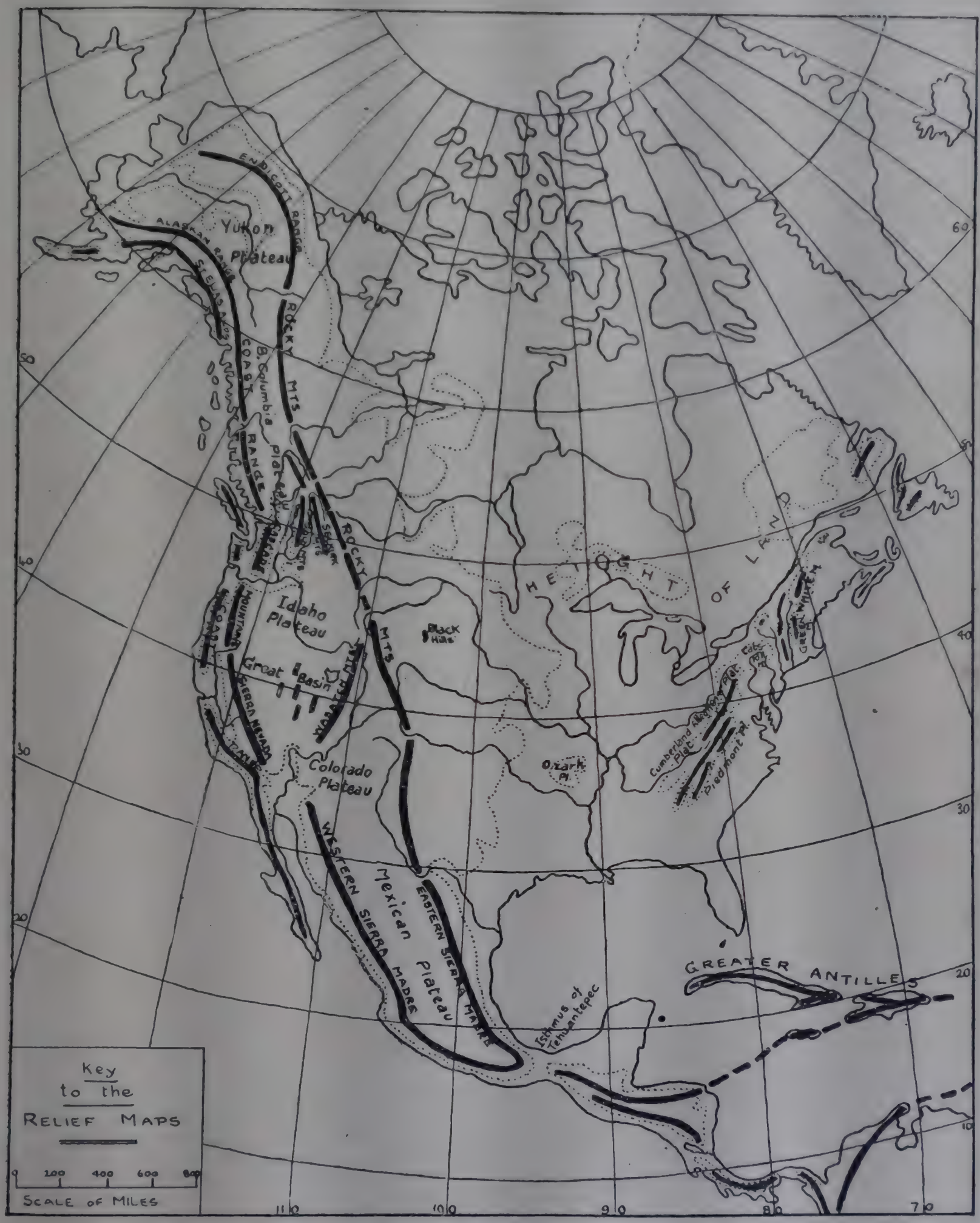

Yukon Plateau
Rocky Mts
Idaho Plateau
Great Basin
Black Hills
Colorado Plateau
Ozark Pl
Mexican Plateau
Western Sierra Madre
Eastern Sierra Madre
Isthmus of Tehuantepec
Greater Antilles
Key to the Relief Maps
Scale of Miles

FIG. 3.

In the United States the Western Mountain region consists of:

(*a*) The Rocky Mountains, which, as in Canada, rise steeply from the central plains. The Rocky Mountains attain their greatest height in Colorado, where there are more than thirty peaks over 14,000 ft. high. Several of the east-flowing rivers rise to the west of the chief ranges and leave the mountains in deep gorges (the Missouri, Yellowstone, Arkansas). Between many of the ridges which extend from the main ranges are broad open spaces called "parks." The Yellowstone Park in Wyoming is a region famous for its **geysers** and mud volcanoes.

(*b*) A region of interior Plateaus and Basins. The Idaho Plateau is a lava plateau in which the Snake River has cut a **canyon** 2,000 ft. deep. The Great Basin which lies to the south of the Idaho Plateau consists of several areas of inland drainage, the largest of which is the Great Salt Lake Basin. Many **block mountains** (Book II, Fig. 85), half buried in rock waste, run north and south within the basin. Occasional heavy rainstorms give rise to torrents which cut deep gorges in the mountain slopes. At the mouth of each gorge immense **fans** of rock waste are formed in which the mountain streams disappear, as on the western slopes of the Wasatch Mountains. South of the Great Basin is the Colorado Plateau, into which the Green, Grand, and Colorado Rivers have cut deep canyons. The Grand Canyon of the Colorado in Arizona is 200 miles long and from 3,000 to 5,000 ft. below the surface of the plateau. Here and there in Arizona and New Mexico are **mesas** and **buttes** (Fig. 88, Book II). They are scattered remnants of sedimentary rocks or lava flows which once covered the regions in which they are found.

(*c*) The Cascade Mountains and the Sierra Nevada, which are a continuation of the Coast Range of Canada. These mountains rise steeply from the plateaus and basins of the interior, but on the west the slope is less steep. They contain a large number of clear **rock-basin lakes.** All the highest peaks are volcanoes. The famous Yosomite Valley in the Sierra Nevada is a **rift valley,** the walls of which are nearly 4,000 ft. high (Fig. 86, Book II).

(*d*) A broad longitudinal valley, occupied by the Willamette, Sacramento, and San Joaquin Rivers. The rivers which flow from the Sierra Nevada to the California Valley have covered the floor of the valley with rock waste and have built enormous alluvial fans of faint slope; one of these fans, for example, has a radius of forty miles.

(*e*) The Coast Range, which is nowhere very high. The Coast Range is cut through by the Columbia and Sacramento Rivers.

In Mexico we find:

(*a*) The Eastern Sierra Madre, rising from a narrow, swampy, fever-haunted **coastal plain.**

(*b*) A lava-built plateau, most of which is 8,000 ft. high. Above the surface of the plateau rise the peaks and ridges of earlier mountains half buried in the lava.

(*c*) The Western Sierra Madre, which slopes steeply to the Gulf of California and the Pacific Ocean.

(*d*) The Gulf of California, a drowned longitudinal valley at the head of which the Colorado River has built a **delta.**

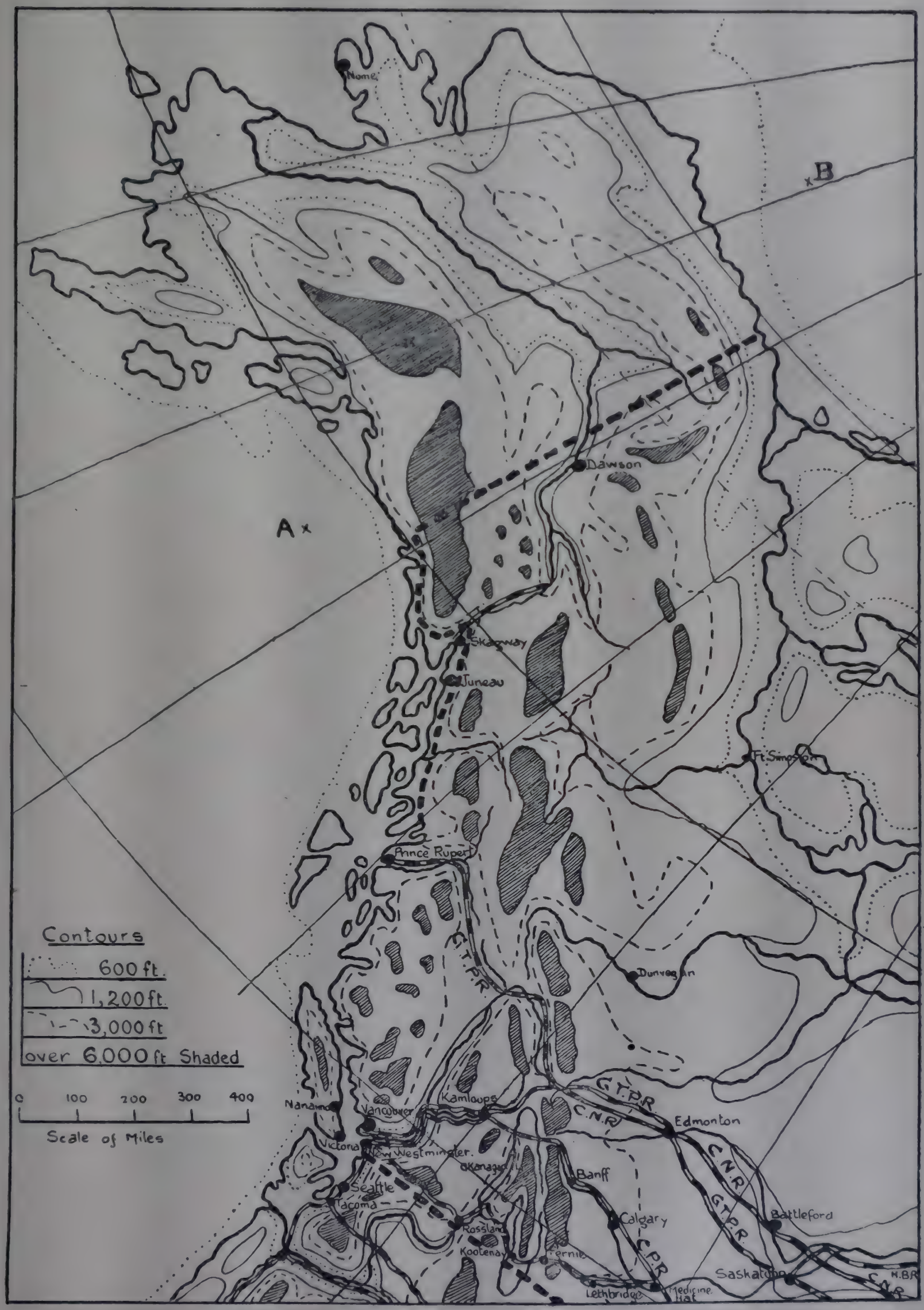
(*e*) The California Peninsula, a continuation of the Coast Range of the United States.

South of Mexico City the Sierras join in a line of volcanoes, the highest of which are Orizaba and Popocatepetl. Only Colima is active. At the Isthmus of Tehuantepec the land sinks to below 400 ft.

In Central America the Western Mountains are continued. The ranges are highest near the Pacific coast, where there are many active and many extinct volcanoes. Some of the ranges run east and west and are continued in the Greater Antilles. The Lesser Antilles, which extend from Porto Rico to Trinidad, consist of (*a*) an inner chain of volcanic islands, which are the summits of a submerged mountain range, and (*b*) an outer chain of coral islands. The Bahama Islands and much of the low peninsula of Yucatan are of coral formation.

Eastern Highlands

The Eastern or Appalachian Highlands extend from Newfoundland to Alabama. They are divided by the Hudson River into (i) the New England Highlands and (ii) the Southern Appalachians. They are cut across from east to west by the St. Lawrence Estuary and by the Hudson-Mohawk Valley. This was once a region of folded mountains. Denudation reduced the mountains to a peneplain. Later the whole region was uplifted and carved by erosion into ridges and valleys. The New England Highlands everywhere show evidences of the work of ice. Lakes are numerous and all the rivers have waterfalls. The Southern Appalachians are higher and broader than the New England Highlands, and consist of the following belts (Fig. 8): (i) the Piedmont belt, rising above the coastal plain; this belt is a region of old hard rock which weathers into poor soil; (ii) the Blue Ridge, a belt of parallel ridges and


Nome
B
Dawson
A
Skagway
Juneau
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Prince Rupert
Dunvegan
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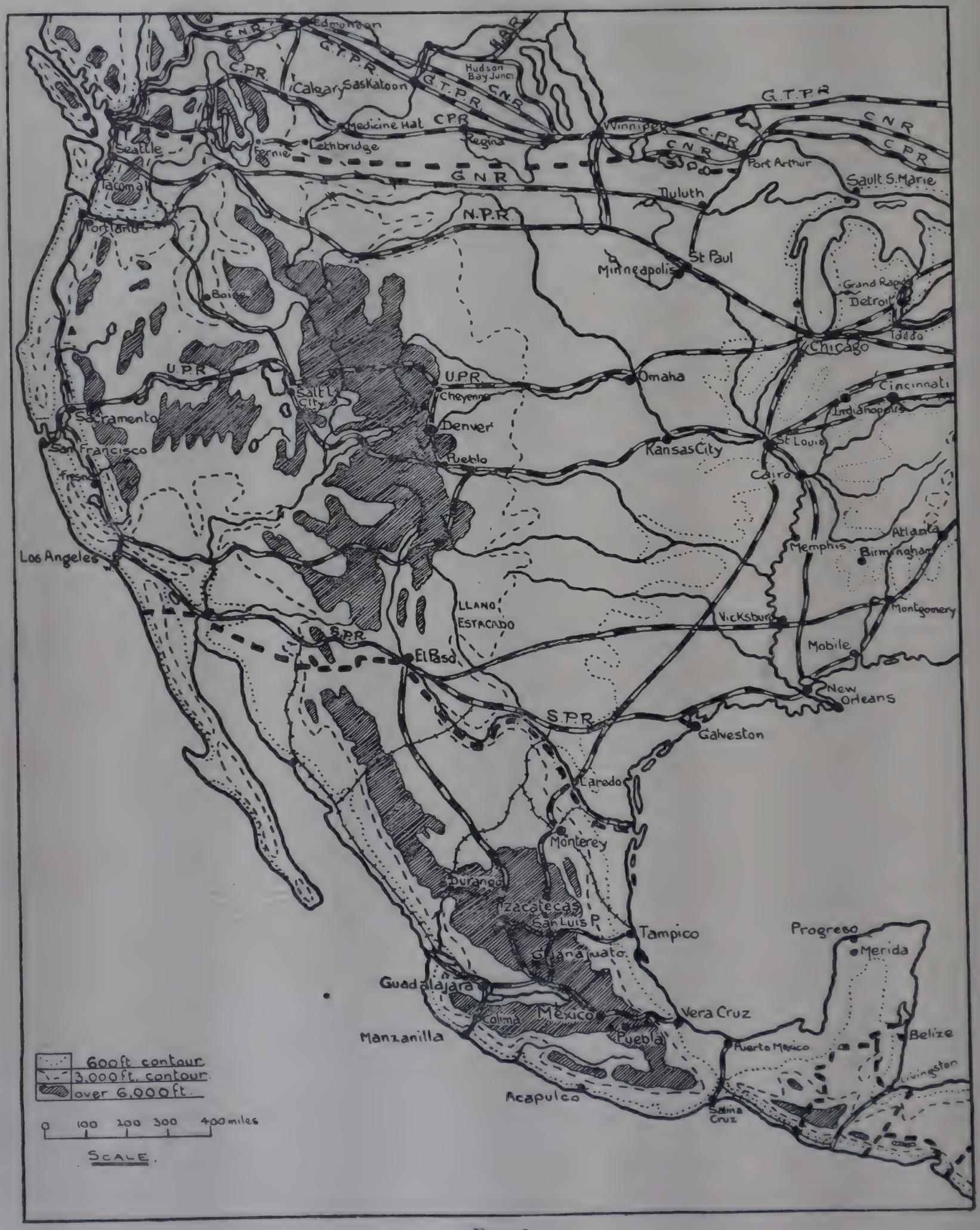
600 ft.
1,200 ft.
3,000 ft
over 6,000 ft Shaded
0 100 200 300 400
Scale of Miles
Nanaimo
Vancouver
Kamloops
Victoria
New Westminster.
Okanagan
Banff
Edmonton
Seattle
Tacoma
Calgary
Battleford
Rossland
Kootenay
Fernie
Saskatoon
Lethbridge
Medicine Hat
C.T.P.R.
C.N.R.
C.P.R.
H.B.R.

FIG. 4.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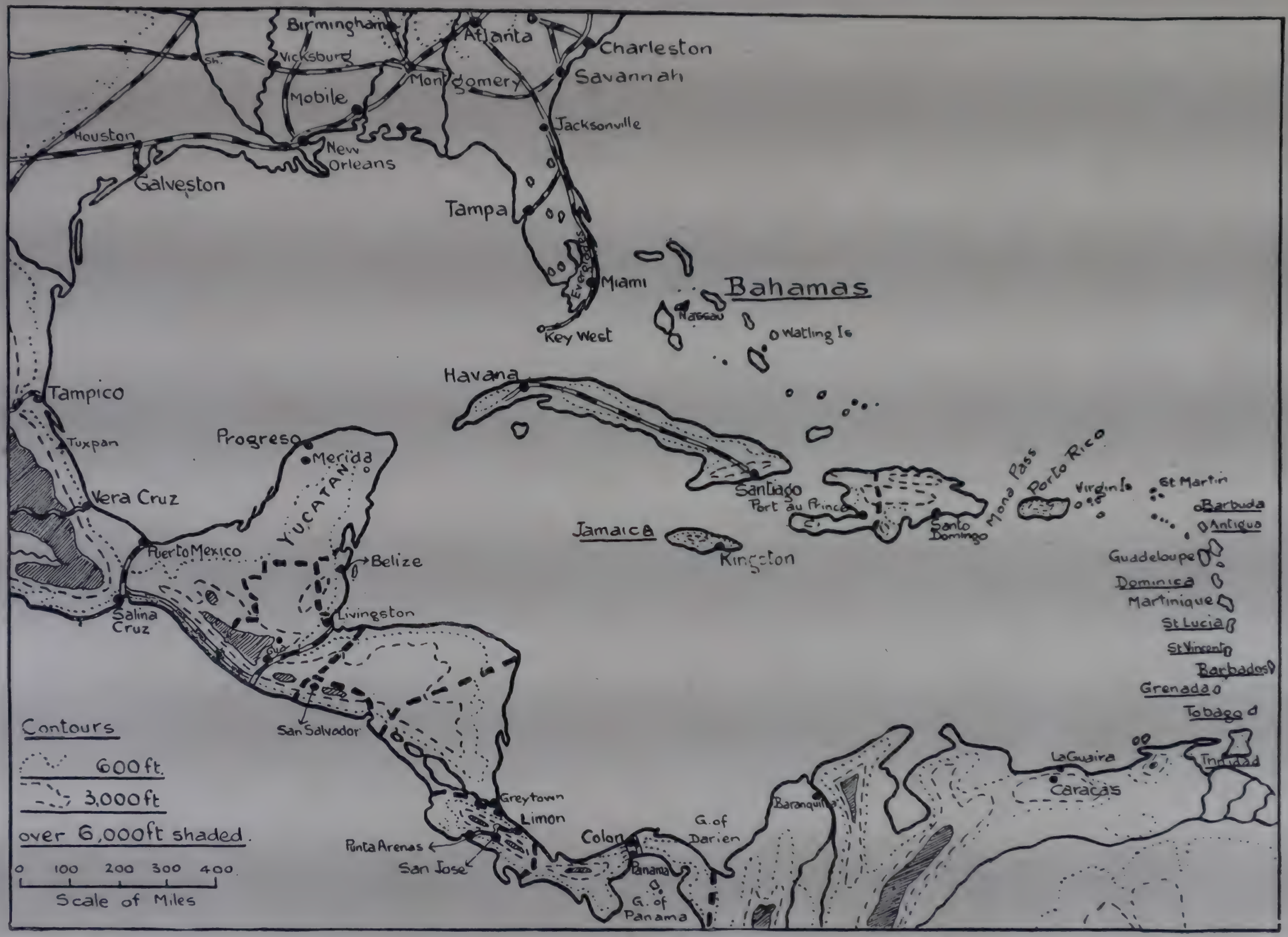
Tampico
Progreso
Merida
Guanajuato
Guadalajara
Vera Cruz
Colima
Mexico
Puebla
Manzanilla
Belize
Puerto Mexico
Livingston
Acapulco
Salina Cruz
600 ft. contour
3,000 ft. contour.
over 6,000 ft.
0 100 200 300 400 miles
SCALE.

FIG. 5.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Caracas
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Greytown
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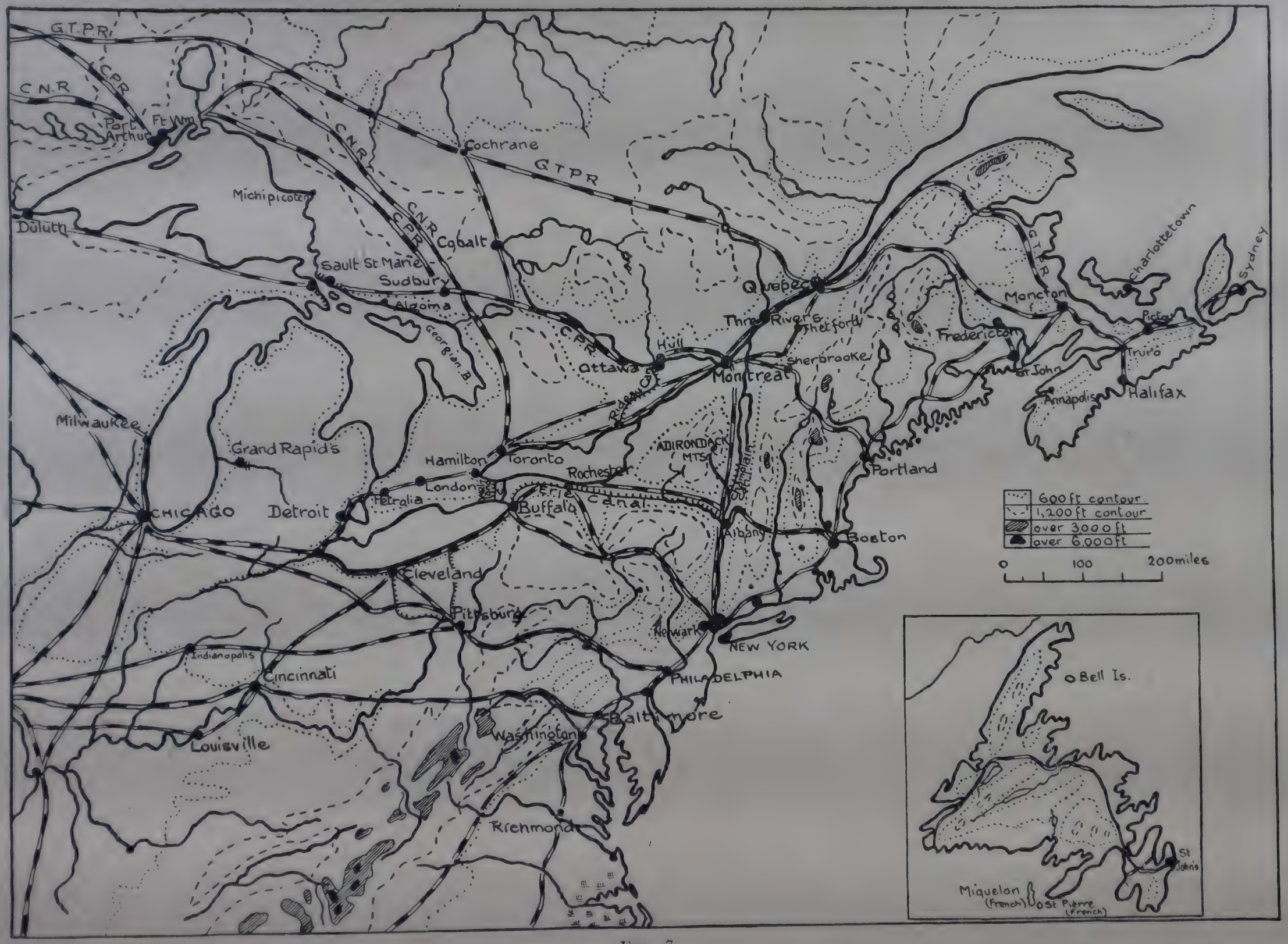
Scale of Miles

FIG. 6.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Sherbrooke
Montreal
Riv. St. Lawrence
ADIRONDACK MTS.
Lake Champlain
Albany
Boston
NEW YORK
Newark
PHILADELPHIA
Portland
Moncton
Fredericton
St John
Annapolis
Halifax
Truro
Pictou
Charlottetown
Sydney
600 ft contour
1,200 ft contour
over 3000 ft
over 6,000 ft
0
100
200 miles
Bell Is.
St John's
Miquelon (French)
St Pierre (French)

FIG. 7.

valleys; (iii) the Appalachian Valley, a broad fertile region crossed by low parallel ridges; (iv) the Alleghany Plateau, whose dissected **escarpment** faces eastwards, is there termed the Alleghany Mountains. The plateau itself slopes gradually westwards, and is deeply trenched by rivers. In the south the plateau is called the Cumberland Plateau, and to the west of the Hudson River receives the name of Catskill Mountains.

FIG. 8.

THE NORTHERN PENEPLAIN

The boundary of this region is roughly defined by a series of lakes, extending from Great Bear Lake to Lake Ontario, and by the St. Lawrence River. The Adirondack Mountains and the hilly region around Lake Superior also form part of the peneplain. The name Laurentian Plateau is sometimes given to that part of the peneplain which lies between the St. Lawrence River and Hudson Bay. Once a region of fold mountains, age-long erosion has reduced it to a peneplain, which slopes gradually towards Hudson Bay. Everywhere the work of ice is to be seen. Although, on the whole, it is a region of hard rock almost bare of soil, a great clay belt of extraordinary fertility extends westwards for 400 miles from the eastern boundary of Ontario. (The Grand Trunk Pacific Railway runs through this belt.) The divide which separates the rivers which flow into the Great Lakes and the St. Lawrence River from those which flow into Hudson Bay is called the Height of Land. The waterfalls of the rivers which flow into the St. Lawrence are of great economic importance, particularly the Chaudière Falls of the Ottawa River and the Shawinigan Falls of the St. Maurice River.

THE CENTRAL PLAIN

This plain roughly corresponds to the basin of the Mississippi. It is composed almost entirely of horizontal layers of sedimentary rocks, the only exceptions being the Black Hills of Dakota and the Ozark Plateau, which rise above the plain like islands in the sea. From Cairo to the sea much of the plain is covered by alluvium deposited by the Mississippi, which frequently overflows its banks. A northern extension of the plain stretches to the Arctic Ocean between the Rocky Mountains and the northern peneplain, over which the Mackenzie River flows to the sea

THE ATLANTIC COASTAL PLAIN

The coastal plain extends southwards from New York. The inward margin of the coastal plain runs, more or less, along the 100-ft. contour line. From the sea to this line the slope is very gentle, but farther inland it steepens rapidly, with the result that waterfalls have developed at the **Fall Line,** that is, at the seaward margin of the Piedmont Plateau, where the rivers leave the plateau for the coastal plain. The parts of the plain which lie nearest the coast are so young that marshes are common. The coastal plain is continued around the Gulf of Mexico. Here the Mississippi has built a delta nearly one and a half times the area of Wales.

CHAPTER III

ICE, RIVERS, LAKES, COASTS, AND ISLANDS

1. THE northern half of North America was covered, long ago, by a sheet of ice many hundreds of feet in thickness, and its effects are evident to this day. Some of the most important surface features of Canada, Newfoundland, and the United States are largely, if not entirely, due to the work of ice in past ages. As most of our own country was covered by an ice sheet during the same period, it is not necessary to go very far from home to see some of the surface features which are due to glaciation. Examine the surface features of your own district, or of a district visited by you, and discover which, if any, of the following evidences of ice work are to be seen :

(*a*) Large blocks of rock, often entirely different from the rocks of the neighbourhood (Fig. 9) ; (*b*) polished and smoothed rock surfaces bare of soil (Fig. 9) ; (*c*) a region of mounds and ridges of clay, with swamps, ponds, and peaty deposits lying in the hollows (Fig. 10) ; (*d*) soil, composed of clay and a mixture of stones of all sizes (Fig. 11) ; (*e*) broadened and deepened valleys with steep sides and flat floors, the valley sides showing signs of having been smoothed (Fig. 12) ; (*f*) the valley of a tributary opening high up the side of a deepened main valley (Fig. 22).

2. Collect picture postcards or take photographs of the features described in question 1.

***3.** Glaciers and ice sheets, like rivers, erode, transport, and deposit rock material. Refer to a text-book on physical geography or to any other available source of information for an account of the erosive work of moving ice, and write a short summary in your notebook. Include in your summary an explanation of the terms **erratic, roches moutonnées, hanging valley, cirque, rock basin.**

***4.** Write a short summary of the origin and form of the topographical features which are due to glacial deposits. Include in your summary an explanation of the terms **boulder clay, drift, lateral moraine, terminal moraine, wash plain.**

5. Name important ways in which human interests have been (*a*) benefited, (*b*) injured by the work of ice in regions known to you.

6. Fig. 25 shows the parts of North America affected by ice sheets. Regions marked A on the map are regions of bare rock, thin stony soil, rock basin, and morainic lakes and marshes. Regions marked B are covered with fertile silt, and mark the position occupied by glacial lakes. Regions marked C consist largely of mounds and ridges of boulder clay, gravel, and sand, with hundreds of lakes and marshes lying in the hollows. Regions marked D are, for the most part, covered with deep fertile soil, borne by streams from the ancient ice sheet.

Translate :

F. 7. A mésure qu'on s'élève en altitude la température diminue. Il y aura donc une altitude au-dessus de laquelle la neige persistera en toutes saisons. Cette altitude varie suivant les latitudes, les climats, l'abondance des précipitations, l'inclinaison des pentes, et détermine l'emplacement de ce qu'on appelle le **" snow-line."** Au-dessus du " snow-line " la neige forme de vastes champs de neiges persistantes, où toute nouvelle chute de neige ajoute à l'épaisseur de la masse amoncelée. La majeure partie de la neige glisse lentement vers les vallées, et en descendant les pentes se change en glace : c'est le glacier qui commence.

8. Examine your isotherm maps (Figs. 33 and 34) and relief maps of North America, and state in which parts of the continent you would expect to find glaciers and snowfields to-day.

9. Why are there more glaciers in the Cascade Mountains and in the Sierra Nevada than in the Rocky Mountains ?

***10.** Write notes on (*a*) the glaciers of Alaska and (*b*) the Greenland ice sheet.

11. Waterfalls and rapids are common features of glaciated regions. These we shall consider after revising the river features discussed in Book II. Draw a diagram to show how the gorge of the Zambesi River was formed. Below the Niagara Falls the river flows in a gorge seven miles long. The strata on one side of the gorge correspond exactly in character and position to those on the other side, and at the falls the same rocks occur in the same order (Fig. 13). Write a brief account of the history of the Niagara River.

FIG. 9.

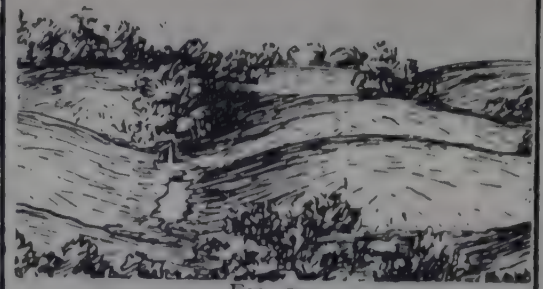


FIG. 10.

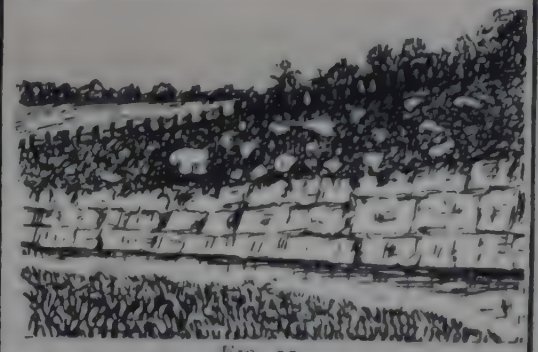


FIG. 11.

FIG. 12.

FIG. 13.

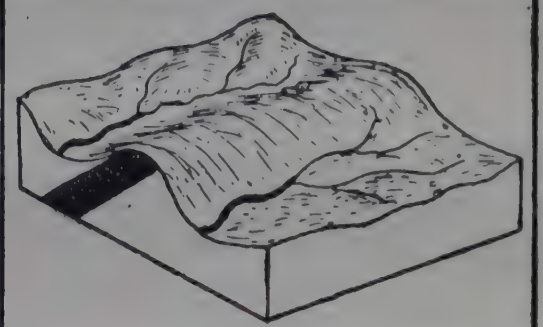


FIG. 14.

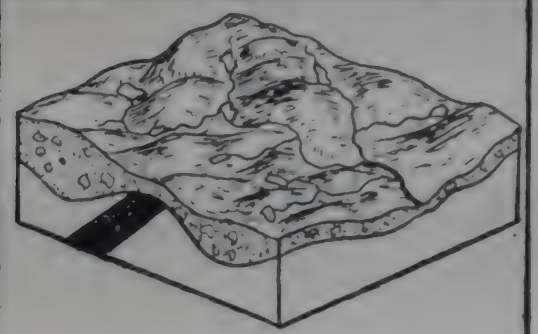


FIG. 15.

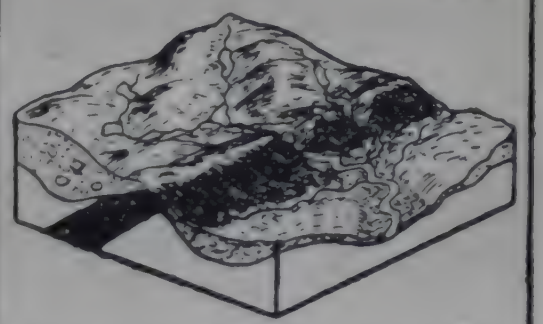


FIG. 16.

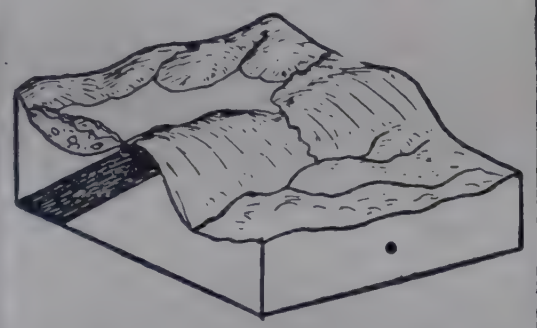


FIG. 17.

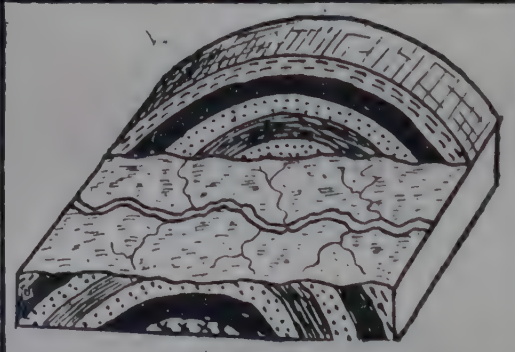


FIG. 18.

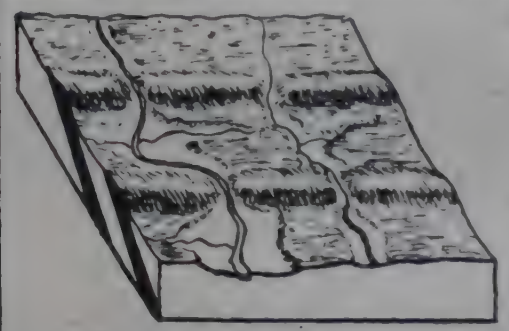


FIG. 19.

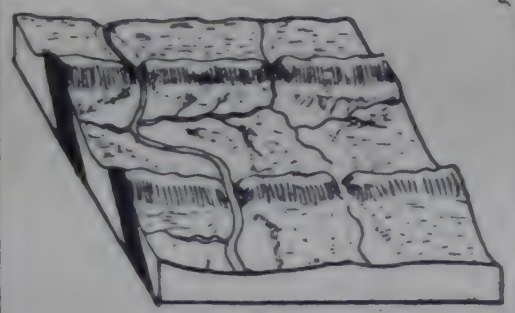


FIG. 20.

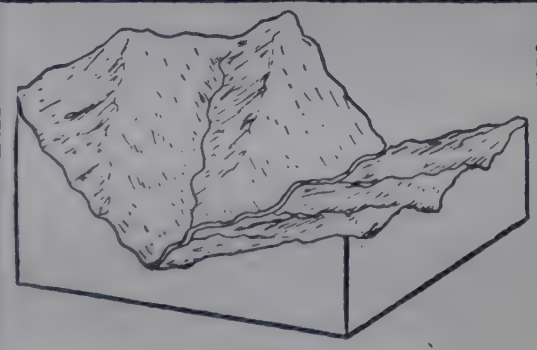


FIG. 21.

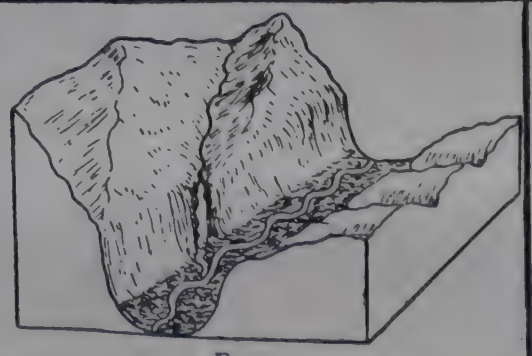


FIG. 22.

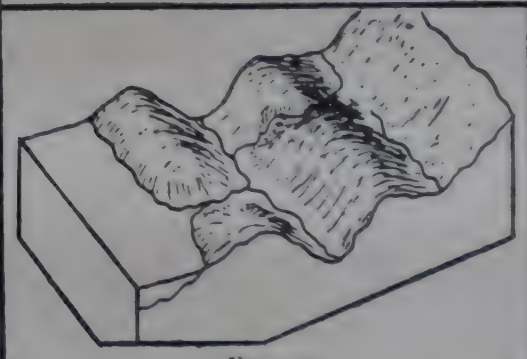


FIG. 23.

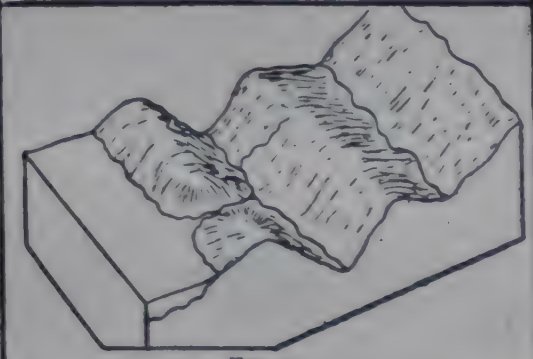


FIG. 24.

12. Describe and account for the following features of a river and its valley: interlocking spurs, alluvial fans, meanders, flood plains, ox-bow lakes, natural embankments, bluffs, deltas, distributaries. Illustrate your answer by means

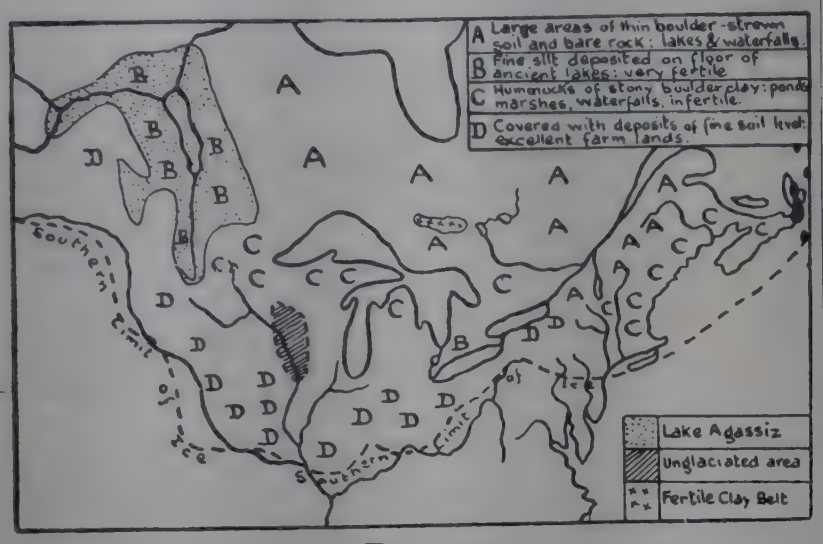

A Large areas of thin boulder-strewn soil and bare rock: lakes & waterfalls.
B Fine silt deposited on floor of ancient lakes: very fertile
C Hummocks of stony boulder clay: ponds marshes, waterfalls, infertile.
D Covered with deposits of fine soil level: excellent farm lands.
Southern limit of ice
Southern limit of ice
Lake Agassiz
Unglaciated area
Fertile Clay Belt

FIG. 25.

of block model diagrams, sketches, or photographs.

13. The deposits left by the ice sheet disturbed the pre-glacial drainage system. Many river valleys were filled with drift. Fig. 14 shows a part of the drainage system before the land was covered by ice. Fig. 15 shows the same region after the ice had disappeared. What changes have occurred? Fig. 16 shows the same region at a still later stage. Account for the development of the waterfall.

14. Many rivers were dammed by drift deposited across the valley floors. Fig. 17 shows the result of damming one of the valleys shown in Fig. 14. Would you expect a waterfall to develop at a later stage? Give a reason for your answer.

15. Fig. 21 shows a normal tributary in the upper course of a river. Fig. 22 shows the same valley after the disappearance of a glacier which later occupied the main valley. Account for the waterfall.

16. Long narrow lakes are often found in U-shaped valleys, whose natural outlets have been barred by moraines. In such cases a river usually continues its course down the original valley (Fig. 12). Suggest reasons for this. Sometimes two lakes, separated by flat alluvial land, occupy the same valley. How does Fig. 12 suggest the way in which two separate lakes are formed?

17. Compare the shapes of the valley lakes of British Columbia, the Southern Andes, and the New Zealand Alps. What do you notice? Suggest how these lakes were formed.

18. In many places the moving ice gouged hollows in the rocks over which the ice passed. These hollows, filled with water, are called **rock-basin** lakes.

Most of the lakes and waterfalls of North America were formed in one or other of the ways described in this chapter. Examine large-scale maps of different parts of New England and Eastern Canada. Notice that all the rivers either pass through lakes or have lake connections and that all have waterfalls.

19. Although upwards of 90 per cent. of all the lakes of the world are due to ice, the remaining lakes have varied origins. Discuss the origin of Great Salt Lake (Utah).

Classify the chief lakes of North America and of the three southern continents according to their origin.

20. Fig. 24 shows parts of two longitudinal valleys. Fig. 23 shows the same region at a later stage. Describe what has happened. Explain the terms longitudinal valley, transverse valley, and **river capture.** What conditions are necessary before river capture becomes possible?

21. With the help of your atlas write an account of the courses of the Fraser and Columbia Rivers.

22. Turn to your maps of South America. Where does the political boundary between

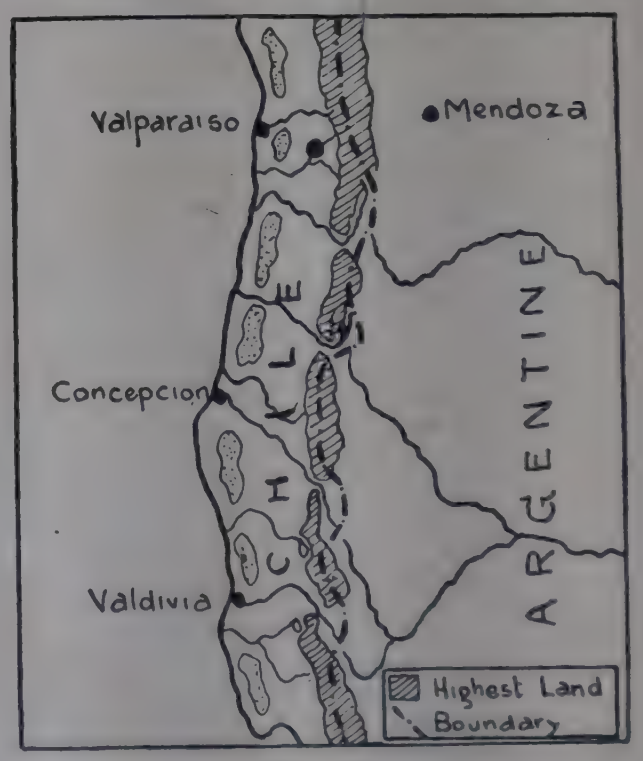


FIG. 26.

Chile and Argentina lie? It was assumed that this boundary coincided with the line of the highest land between the two countries, but when it became necessary to fix the boundary accurately it was found that the water parting

departed considerably from this line to the territorial advantage of Chile. Fig. 26 shows part of the boundary. Notice that the rivers of Chile have captured the head-waters of the rivers of Argentina, thus moving the divide eastwards. Explain why the rivers of Chile have greater cutting power than the rivers of Argentina.

23. Draw a sketch map to show those rivers of Canada and the United States which have cut through the eastern ranges of the Rocky Mountains. Suggest one way in which mountain passes may be formed. Mark on the sketch map the position and height of the passes carrying railways.

24. The drainage system of the Southern Appalachians presents many interesting features. Fig. 27 is a map of part of this region. The shaded areas represent mountain ridges. What parts of the world are shown in Figs. 28 and 29? Compare the drainage systems of the three regions referred to in this question. What features are common to all of them?

FIG. 27

FIG. 28.

FIG. 29.

25. Fig. 18 represents a peneplain produced by the denudation of the upfold shown in the rear of the diagram. Notice that, as a result of denudation, a variety of rocks **outcrops** at the surface of the peneplain. (The hardest rocks are in solid black in the cross sections).

At a later period in its history this peneplain was slowly uplifted. What effect would the uplift have upon the cutting power of certain of the streams?

Figs. 19 and 20 show a part of the peneplain at different stages of the uplift. With the help of these diagrams explain the origin of the parallel ridges and of the longitudinal and transverse valleys.

A transverse valley through which a river flows is called a **water gap.**

26. Do you notice any evidences of river capture in Fig. 27? Figs. 19 and 20 show how the capture was effected. Notice the empty gap in Fig. 20. Such a gap is called a **wind gap.**

27. Draw a sketch map to show the chief rivers of the Southern Appalachians, and describe the courses of the Susquehanna and Hudson-Mohawk Rivers.

28. Draw sketch maps of the St. Lawrence, Mississippi, and Colorado Basins, and describe the course of each river. In each case mention any important features which are due to climate, structure, and relief respectively.

Coast and Islands

29. Examples of most of the features discussed in the following questions are to be found in Britain. When you visit the seaside you should observe the form of the coast, the work of waves and currents—constructive and destructive. Collect picture-postcards of different coast forms and try and discover how each form was produced.

30. By careful soundings it has been found that the part of the ocean floor which borders the continents slopes very gradually until it lies about 600 ft. (100 fathoms) below the surface of the ocean. As at that depth the slope begins to steepen rapidly, the 100-fathom line is considered to be the real margin of the continental area, and that part of the ocean floor which lies between the shore line and the 100-fathom line is called the **continental shelf.** Islands which lie upon the continental shelf are called **continental islands.**

31. Examine a **bathy-orographical** map (that is, a map which shows both heights and depths)

of North America. Where is the continental shelf broadest? narrowest?

*32. Describe the surface features of the continental shelf. What and where are the Grand Banks?

33. Draw a map of North America as it would be if the land sank 600 ft. Colour the map to show the relief. State where the alteration in the shape of the continent is greatest and least. What parts of the mainland have been converted into islands?

34. Slight changes in the level of the land may produce great changes in the form of the coast-line. Make a clay model of Fig. 12 and place it in a trough. Pour water slowly into the trough until the floor of the valley is covered.

35. Sinking of the land may cause the sea to penetrate the deepened valleys of a glaciated region producing a **fiord coast.** The coast of British Columbia is a fiord coast. In which parts of the Southern Hemisphere are similar coasts to be found? Describe the characteristic features of a fiord coast.

36. Examine the map which you have drawn in answer to question 33. Explain (*a*) why very little change has occurred in the coast-line of Oregon; (*b*) why the valley of California has been converted into an extensive arm of the sea.

37. The west coast of North and South America runs more or less parallel with the young mountain ranges. Divide this coast into "types," and describe the features of each type.

38. Draw a map of North America as it would be if the sea floor rose 600 ft. Continue the rivers across the newly-formed land and colour your map to show the relief. Where have the greatest changes taken place? Name the chief islands which have become part of the mainland.

Mark the new coast-line of that part of the continent which lies north of the mouths of the Columbia and Hudson Rivers in red ink. This red line will give you a rough idea of the position of the coast-line of this part of the continent before the Ice Age. Its present position is due to subsidence.

39. South of New York the land has been uplifted. An uplift of the sea-bed gives rise to a coastal plain which emerges at a low angle from the water (Figs. 81 and 82, Book II). Such a coastal plain will have a regular, straight, or curved shore line. Why?

Waves, tides, and currents, by moving rock waste and depositing it elsewhere, help to modify this simple coast-line.

*40. Refer to a text-book of physical geography or to any other available source for an explanation of the origin of sand bars, spits, beaches, lagoons, and salt marshes, all of which are common features of young coastal plains.

Examine the largest scale maps available of the coastal plains of the United States and Mexico for examples to illustrate each of the above features.

41. Fig. 30 is a map of a coastal plain in which a river and its tributaries have formed shallow valleys. Show the changes which would occur if this region sank 60 ft. by colouring the sea and the land below 60 ft. blue. Compare the map with the map of Chesapeake Bay and Delaware Bay, and write an account of the physical history of this region.

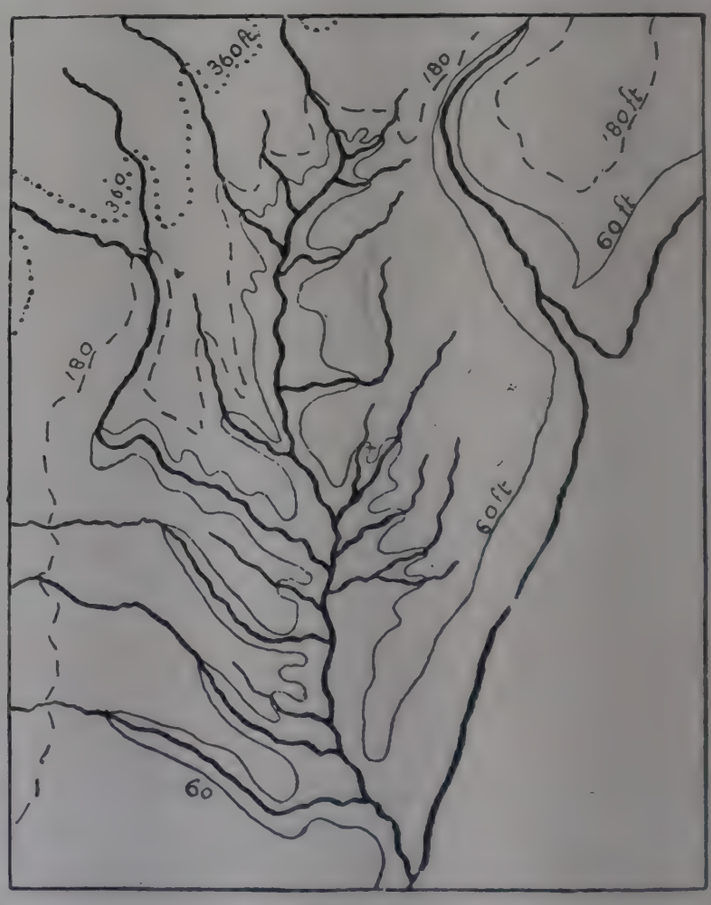


FIG. 30.

42. Distinguish between continental islands, coral islands, and volcanic islands, giving examples of each type.

CHAPTER IV

WEATHER, LATITUDE, SEASONS

P. 1. WHEN the sun shines it radiates heat, and the surface of the earth is warmed by absorption of the radiated heat. The earth warms the air above it by *conduction* and *radiation*. Permanent heating of air over a given region gives rise to permanent *convection* currents.

Explain the meaning of the words printed in italics.

P. 2. Why is frost more likely to occur on clear than on cloudy nights? How does the same principle explain the cold nights of tropical deserts and high plateaus?

P. 3. Describe a simple experiment which proves that air cools by expansion.

P. 4. "Water has a greater specific heat than any other substance." What is meant by this statement? How does it explain the fact that in temperate latitudes the interiors of continents have a greater range of temperature than the oceans?

P. 5. Perform a simple experiment to show that the air contains water vapour.

P. 6. What is meant by "the latent heat of vaporisation of steam is 536"? Describe an experiment which proves that surfaces from which evaporation takes place are cooled. How does this fact explain why the air often feels cooler after a shower of rain on a hot summer's day?

P. 7. Point to some simple everyday facts to prove that evaporation takes place more rapidly (*a*) on a dry day than on a close day in summer; (*b*) on a warm dry day than on a cold dry day. Perform an experiment to show that wind accelerates evaporation.

P. 8. What is meant by **"dew-point"**? Explain the principle and use of the wet- and dry-bulb thermometer. Why are the wet and dry readings about equal on a damp day? Explain the terms capacity, absolute humidity, and relative humidity.

P. 9. How could you find by using the wet- and dry-bulb thermometer which of two rooms at the same temperature contained the greater amount of water vapour? Why must the rooms be at the same temperature for this experiment?

P. 10. Why would you not expect to find any great difference between the readings of the wet- and dry-bulb readings during cold weather? How does this fact help to explain the small precipitation (*a*) of Polar regions; (*b*) of the interior of continents in cool temperate latitudes in winter?

P. 11. What is meant by "the latent heat of fusion of ice is 80." How does this fact help to explain (*a*) the shortness of spring in Central Canada; (*b*) the coldness of the air over Greenland in summer?

P. 12. How does Boyle's Law help you to prove that (*a*) the pressure and density of the atmosphere is greatest at sea-level, (*b*) rising air expands? Read through your answer to question 3 and explain why the Doldrums are wet and the Horse Latitudes are dry.

P. 13. Explain why the sun's rays are more intense at high altitudes than at sea-level.

P. 14. What effect have (*a*) variations in temperature, (*b*) variations in the amount of water vapour in the air, upon the pressure? Why?

P. 15. Perform an experiment to show that air moves from regions of higher pressure towards regions of lower pressure.

P. 16. What do you mean by refraction of light? Perform an experiment to show this fact. Why does the sun appear above the horizon after it has actually set?

Weather Observations

17. Explain exactly what is meant by the terms, weather and climate.

The best way to understand the climate of your own country and the conditions which cause the climate of one country to differ from that of another is to observe and record regularly the atmospheric conditions of your own district.

The results of the observations made at the School are entered daily on the "School Weather Chart," and as you are to assist in compiling these charts in future, the symbols and signs used, together with their meaning, are given below.

I.—SIGNS AND SYMBOLS USED ON THE BRITISH DAILY WEATHER MAP.

Sign	Symbol	Meaning	Sign	Symbol	Meaning
b	○ or ◔	blue sky or not more than ¼ clouded	q		squalls
bc	◑	sky ½ clouded	r	●	rain falling
c	◕	sky ¾ clouded	rs	✱	sleet
d		drizzle or fine rain	s	✱	snow falling
f	≡	fog	t	ϒ	thunder
h	▲	hail	w		dew
l		lightning	x		hoar frost
m	≡○	mist	z		haze
o	◍	overcast sky			
p		passing showers			

II.—FORCE AND DIRECTION OF WIND.

Force Number	Name of Wind	Description of Wind	Symbol	Mean Velocity Miles per hour
0	Calm	Smoke rises vertically	⊙	0
1	Light air	Direction of wind shown by drift of smoke	⟜	2
2	Slight breeze	Wind felt on face; leaves rustle; ordinary vane moved by wind	⟜	5
3	Gentle breeze	Leaves and small twigs in constant motion, winds extend a light flag	⟜	10
4	Moderate breeze	Raises dust and loose paper; small branches are moved	⟜	15
5	Fresh breeze	Small trees in leaf begin to sway; crested wavelets on inland water	⟜	21
6	Strong breeze	Large branches in motion, whistling heard in telegraph wires; umbrellas used with difficulty	⟜	27
7	High wind	Whole trees in motion; inconvenience felt when walking against the wind	⟜	35
8	Gale	Breaks twigs off trees; generally impedes progress	⟜	42
9	Strong gale	Slight structural damage occurs (chimney pots and slates removed)	⟜	50
10	Whole gale	Seldom experienced inland, trees uprooted; considerable structural damage occurs	⟜	59
11	Storm	Very rarely experienced. wide-spread damage	⟜	68
12	Hurricane		⟜	over 75

Note.—(1) Direction of wind is shown by the way the arrow is flying. In all the above examples the winds are shown as westerly winds.

(2) The force of the wind is indicated by the number of feathers on the arrow.

(3) On the school chart the velocity of the wind is placed inside the circle at the end of the arrow.

18. Examine the copy of part of the School Weather Chart which is given below. You will notice that observations are made and recorded three times a day. The members of your class, however, are required to make and record the 4 p.m. observations only, and columns containing a cross (×) are to be left blank.

19. A daily examination of the School Weather Chart will enable you to discover many important facts concerning our weather, and you should not be satisfied until you are able to answer the following and other similar questions from your own actual observation:

(*a*) Does the temperature change to any marked extent as a result of a change in direction of wind? Explain.

(*b*) Does the temperature in winter change when rainy weather comes on? If so, does it rise or fall?

(*c*) What kind of weather is associated with a high pressure and with a low pressure (i) in summer, (ii) in winter?

(*d*) Is the pressure high or low when the winter days and nights are very cold? What is the state of the air and sky at such times?

(*e*) During foggy weather in winter (i) is the pressure high or low; (ii) is the temperature very low; (iii) is it calm or windy?

(*f*) Does the weather change with, before, or after a rise or fall in the pressure?

(*g*) Is there any relation between the relative humidity and the type of weather which we

Day of Week and Date	Hour of observation	WIND			WEATHER		RAINFALL		TEMPERATURE				Relative Humidity	BAROMETER		
		Direction	Force	Symbol and miles per hr	At time of observation		Inches	Millimetres	Maximum	Minimum	Dry	Wet		As read	Corrected for M.S.L.	In Millibars
					Sign	Symbol	last 24 hrs		last 24 hrs							
June 4	9 a.m.	N E	3	10	c		12	3	55	42	49	44	67	29·63	30·11	1020
	12·30	N	2	5	bc		—	—	—	—	57	50	61	29·67	30·15	1021
	4 p.m.	N	2	5	b		—	—	—	—	53	47	64	29·67	30·15 X	1021 X

call (i) "close" or "sultry" in summer and (ii) "raw" in winter? (Notice that dry heat and dry cold are easier to bear than damp heat and damp cold.)

Day and Night Altitude of the Sun

20. With the help of a ball and lamp check the following facts relating to the Northern Hemisphere north of the Tropic of Cancer: (see Book I, Chapter VI):

I. At the Summer Solstice (*June* 21).

(*a*) Day is longest.
(*b*) Length of day increases as latitude increases.
(*c*) North of the Arctic Circle there is no night.
(*d*) The altitude of the sun is everywhere greater than at any other time of the year, at corresponding hours of the day.

II. At the Winter Solstice (*December* 22).

(*a*) Day is shortest.
(*b*) Length of day decreases as latitude increases.
(*c*) North of the Arctic Circle there is no day.
(*d*) The altitude of the sun is everywhere less than at any other time of the year, at corresponding hours of the day.

III. At the Equinoxes (*March* 21 *and September* 23).

(*a*) Day and night are equal everywhere.
(*b*) At the north pole the sun is on the horizon throughout the twenty-four hours.

IV. At all times.

The altitude of the sun decreases as latitude increases, at corresponding hours of the day.

G. 21. Draw geometrical diagrams to illustrate as many as possible of the above facts.

22. You have already learned how the varying length of day and the varying altitude of the sun throughout the year cause our summers to be warmer than our winters. Find the difference in hours and minutes between the longest and shortest day at each of the places named in the following table:

Length of Day in Hours and Minutes

—	Lat.	Mar. 21.	June 21.	Sept. 23.	Dec. 21.
		h. m.	h. m.	h. m.	h. m.
Dunvegan .	56	12 8	17 33	12 8	6 48
Winnipeg .	50	12 8	16 18	12 8	7 58
New York .	41	12 6	15 8	12 6	9 7
New Orleans	30	12 5	14 5	12 5	10 5

How does your answer to question 16 help you to explain why the day is not exactly twelve hours long at the equinoxes?

H. 23. Fig. 31 is a diagram of a simple model which will enable you, any fine day, to find the latitude where the noonday sun is in the zenith and at the same time the altitude of the sun at the school town. The model consists of (i) a protractor firmly fixed to an upright; (ii) a movable pointer fastened to the upright by a bolt and thumbscrew; (*c*) a wooden base. At one end of the pointer is an aperture, through which the angular readings are taken. In the pointer are two small pins, lying in the same straight line as the tip of the pointer and the centre of the bolt head.

Construct a similar model. Number the angular divisions on the protractor so that the latitude of the school town appears at the top of the model when finished. (Notice that 53, the latitude of Ruabon, appears at the top in Fig. 31.)

To use the model it must be placed where the sunlight is unobstructed at noon. Place it on a horizontal surface with the edge MN lying along a north and south line. At noon turn the pointer until the tip points directly to the sun. The reading taken through the aperture is the latitude where the sun is in the zenith at noon on that day. After you have taken a reading,

check your result by consulting the tables of the sun's declination, which are to be found in *Whitaker's Almanack*.

Notice that the lines CX and CY point to the zenith and horizon respectively. Hence the altitude of the sun at the time of observation is the angle YCK.

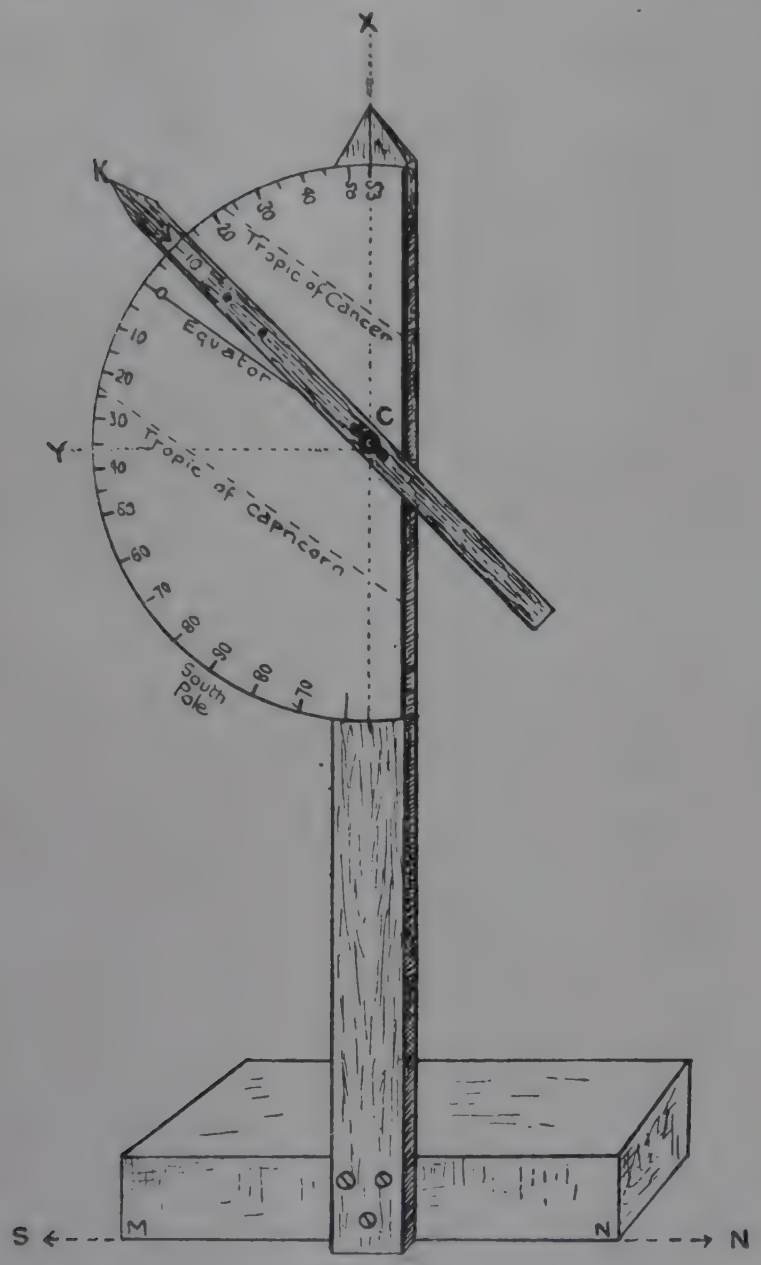


FIG. 31.

24. Explain how you would use the model to find the noonday altitude of the sun at your school town. Draw a diagram to illustrate your answer.

25. On the first day of each month use your model to find the latitude where the sun is in the zenith at noon. Check your results.

26. Turn the pointer to the position it would occupy at noon on (*a*) March 21, (*b*) June 21, (*c*) September 23, (*d*) December 21, and calculate the noonday altitude of the sun at the school town on each of the above dates.

27. You will now have no difficulty in determining the altitude of the noonday sun in any given latitude. Suppose you are required to find the altitude of the noonday sun at Memphis (lat. 35° N.) on March 21, June 21, September 23, and December 21. All that is necessary is to imagine yourself actually performing the above exercise at the town in question with a model similar to your own. Fig. 32 shows the noon-

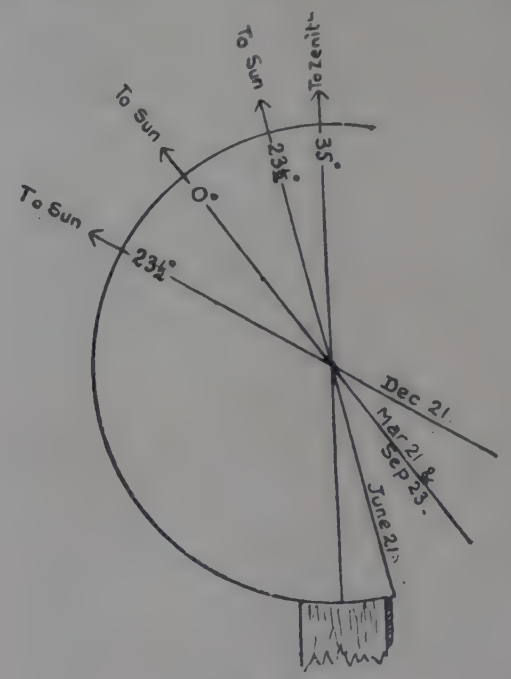


FIG. 32.

day position of the pointer on each of the above dates. Notice that

on March 21 and September 23,
zenith angle $= 35°$
$\therefore$ altitude of sun $= 90° - 35° = 55°$
on June 21
zenith angle $= 35° - 23\frac{1}{2}° = 11\frac{1}{2}°$
$\therefore$ altitude of sun $= 90° - 11\frac{1}{2}° = 78\frac{1}{2}°$
on December 21
zenith angle $= 35° + 23\frac{1}{2}° = 58\frac{1}{2}°$
$\therefore$ altitude of sun $= 90° - 58\frac{1}{2}° = 31\frac{1}{2}°$

28. Find the noonday altitude of the sun at Dunvegan, Winnipeg, New York, and New Orleans on March 21, June 21, September 23, and December 21, and enter your results in tabular form as in question 22.

G. 29. Draw angles to show the altitude of the noonday sun at Dunvegan and New Orleans on June 21 and December 21. How does the difference in the length of day and in the altitude of the sun affect the mean temperature of these places in summer and winter?

30. Point out how the activities of your own district are affected by the duration of daylight in summer and winter.

The duration of daylight is equally important in other parts of the world and should be borne in mind, particularly when discussing the activities of people who live in the same or in higher latitudes than our own.

CHAPTER V

CLIMATE, VEGETATION, MINERALS

1. THE factors which influence the distribution of temperature have been fully discussed in Books I and II, and you should experience no difficulty in dealing with the temperature of North and Central America. In studying the Isotherm Maps of the Continent (Figs. 33 and 34), notice how the isotherms show the influence upon temperature of (*a*) the position, form, and size of the continent; (*b*) the Western Cordillera and the absence of a mountain barrier across the interior lowlands; (*c*) the direction of winds; (*d*) the North Pacific, Californian, and Labrador currents. Remember that the influence of a cold current is more noticeable in summer than in winter, whereas the influence of a warm current is more noticeable in winter.

2. Examine the January Isotherm Map (Fig. 33).

(*a*) Compare the temperature of the coastal regions of British Columbia, Washington, and Oregon with that of the coastal regions of Labrador, Nova Scotia, and New England in the same latitudes and account for the difference.

(*b*) Describe and account for the direction of the 32° F. isotherm. Why does such a large part of the continent lie to the north of this isotherm?

(*c*) Account for the intense cold of the interior of Canada.

3. Study the July Isotherm Map (Fig. 34).

(*a*) Compare the temperature of the coastal regions of California with that of the coastal regions of the Atlantic States in the same latitudes. Account for the difference.

(*b*) Describe and account for the direction of the 60° F. isotherm.

(*c*) Account for the marked southward bend of the 70° F. isotherm off the New England coast.

(*d*) What regions are included within the 90° F. isotherm? Why is this isotherm closed?

4. Place a tracing of the July Isotherm Map over the January Isotherm Map and by marking the points at which the isotherms intersect produce a map to show the annual range of temperature. Where is the range greatest, where least?

***5.** Mexico and Central America are divided, according to temperature, into three regions, called respectively **Tierra Caliente, Tierra Templada, Tierra Fria.** Explain the meaning of these terms and explain why such a division is necessary. In which countries of South America are similar climatic zones to be found?

6. Mark on an outline map of North America the position of the towns named in the table on p. 28. Notice that the first-named town in each set is near the west coast, the second in the interior, and the third near the east coast.

7. Draw curves for each set of temperatures (see p. 28) and briefly account for any differences.

Account for the equable temperature of Colon.

8. Write short separate accounts of the distribution of temperature in January and July in (*a*) Canada and Newfoundland, (*b*) the United States, (*c*) Mexico and Central America, (*d*) the West Indies.

Cyclones

9. You have been told that certain parts of the southern continents owe their winter rainfall to cyclones.

As the climate of the eastern half of North America is also greatly affected by cyclones we shall now try and learn more about them.

Fig. 41 is a map showing the position of a number of places in North America where observers note the weather conditions at certain hours of the day. Fig. 42 shows the readings of the barometer at a number of the above places. These readings were all taken at the same time and were corrected to sea level.

On a sheet of tracing paper draw the coast outline of Fig. 42 and a continuous line to pass through all places where the pressure was 29·3 in. This line is called an **isobar.** Draw isobars for every fifth of an inch until the highest pressure on the map is reached. Enter the pressure along each isobar.

The type of pressure distribution represented by the isobars, which you have just drawn, is called a **cyclone** or a **depression.**

FIG. 33.

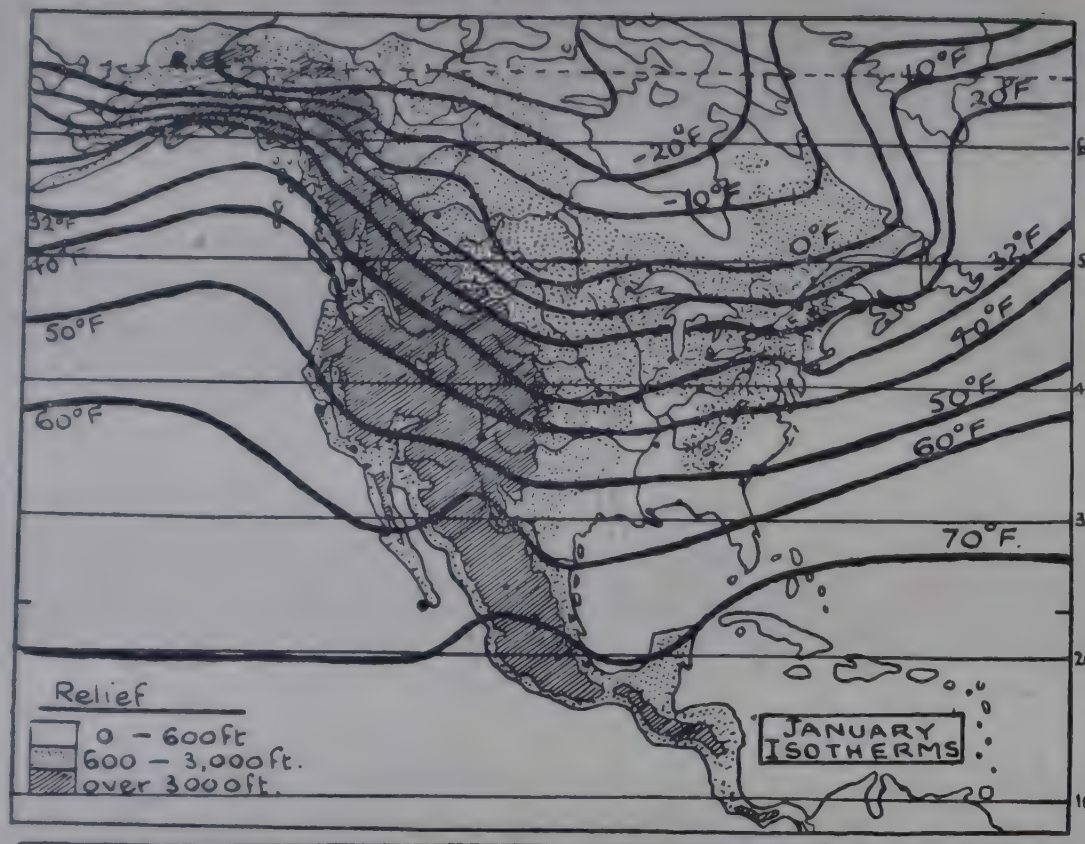
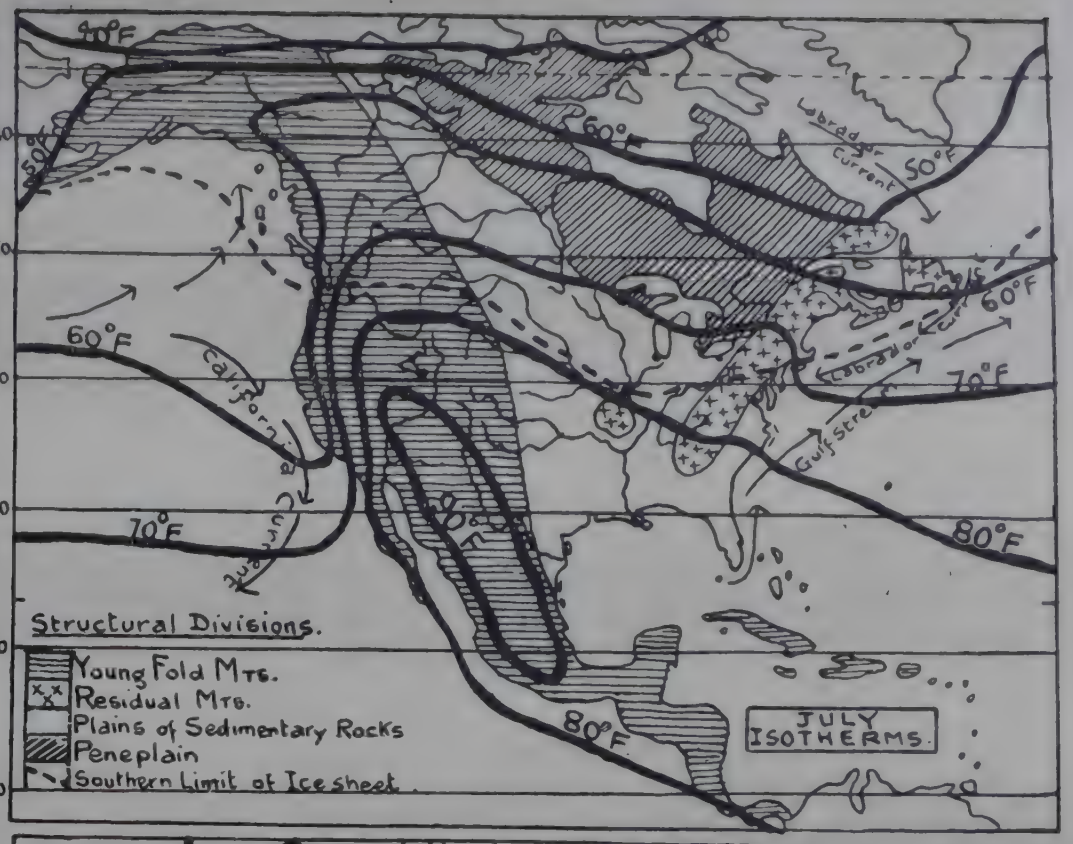


FIG. 34.



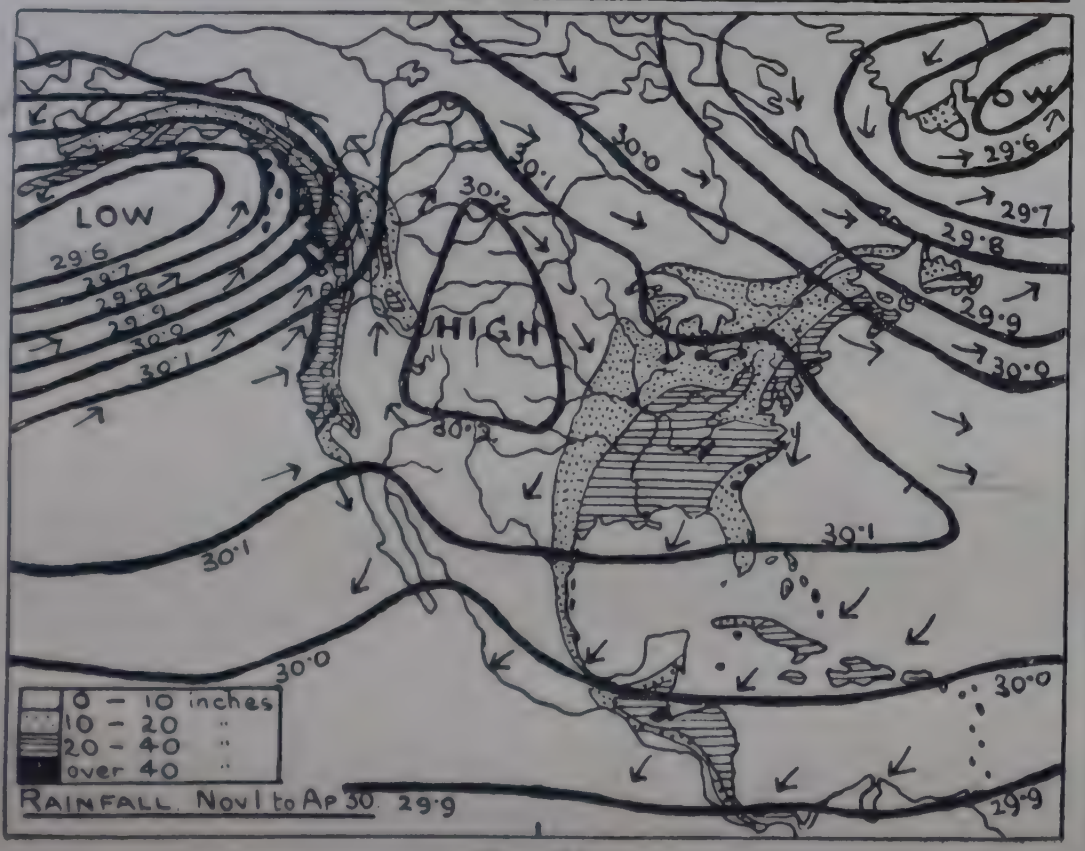


FIG. 35.

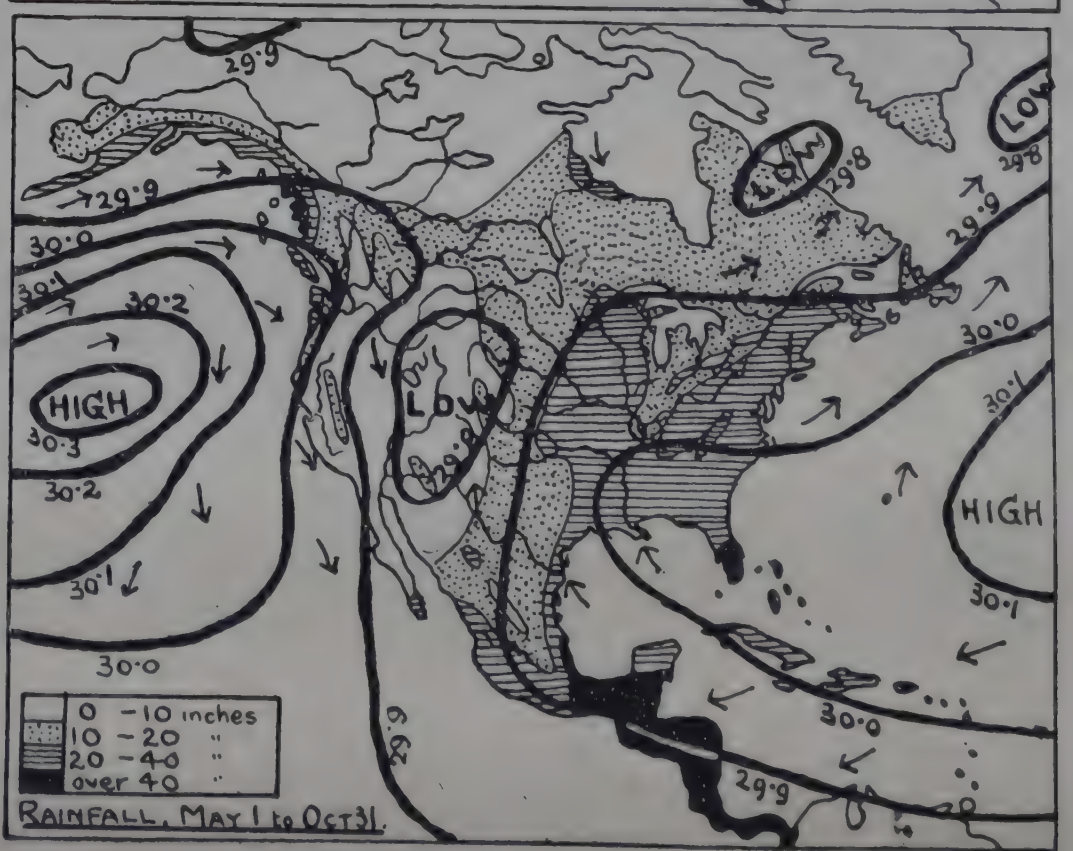


FIG. 36.

FIG. 37.

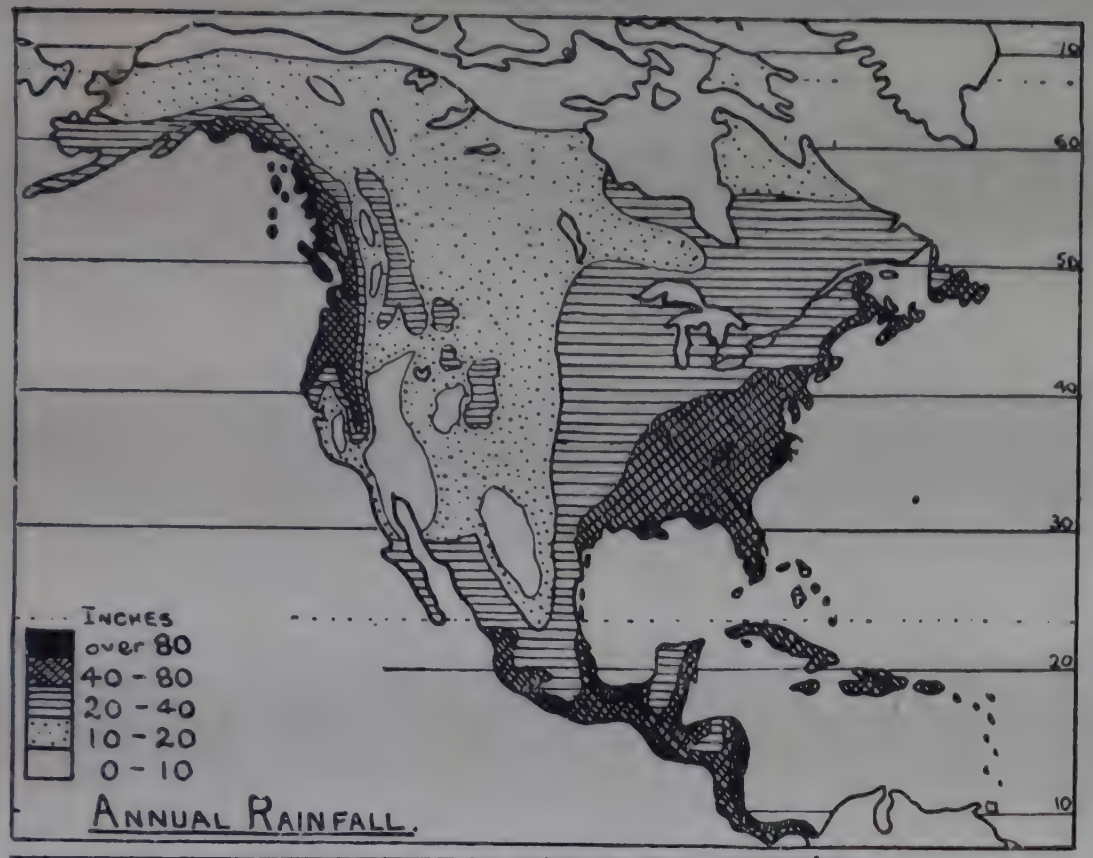


FIG. 38.

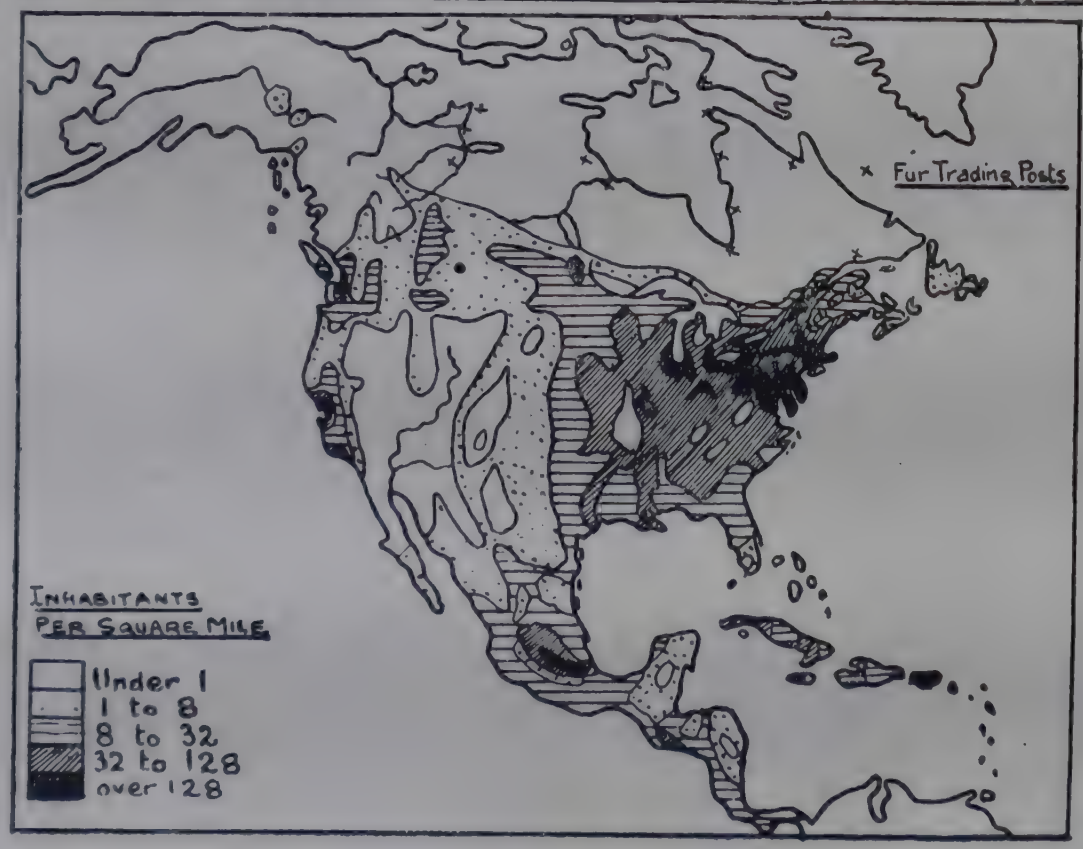


FIG. 39.

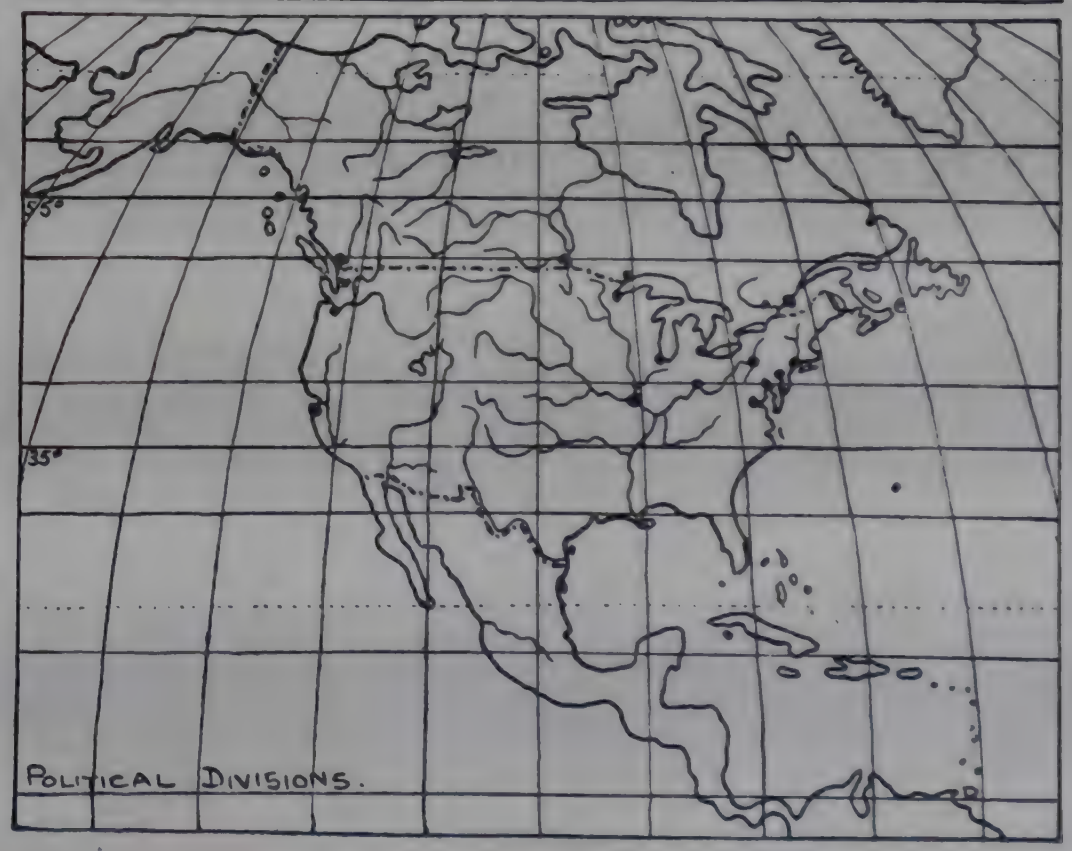


FIG. 40.

TEMPERATURE AND RAINFALL STATISTICS.

Temperatures are degrees F. and the rainfall is given in inches.

—	Lat.	Altitude.		Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
		feet.													
A. Victoria (B.C.)	48	110	T.	39	40	43	48	53	57	60	60	56	50	44	41
			R.	4·5	3·5	2·5	1·7	1·3	0·9	0·4	0·6	2·0	2·5	6·5	5·9
Winnipeg	50	761	T.	−7	−2	12	35	51	62	66	63	53	38	11	3
			R.	0·8	0·9	1·1	1·5	2·3	3·4	3·1	2·4	2·0	1·7	1·1	0·9
St. John's	47	53	T.	22	22	27	35	44	52	57	50	50	45	40	30
			R.	4·5	3·5	4·2	3·8	4·7	2·5	3·4	4·1	4·2	4·7	5·5	5·1
B. Astoria	46	50	T.	41	42	46	50	54	57	61	60	59	53	47	44
			R.	11·1	8·6	7·7	5·4	4·1	2·8	1·1	1·9	3·7	8·5	11·8	11·5
St. Paul's	45	840	T.	12	15	28	46	58	67	72	70	60	48	31	19
			R.	0·9	0·8	1·6	2·3	3·6	4·4	3·4	3·5	3·4	2·3	1·3	1·1
St. John (N.B.)	45	150	T.	19	20	28	39	48	56	60	61	56	45	37	24
			R.	4·8	3·9	4·5	3·5	3·7	3·3	3·6	3·9	3·7	4·5	4·4	4·2
C. San Francisco	38	190	T.	50	51	53	54	56	57	57	58	59	58	56	51
			R.	4·3	3·7	3·1	1·8	0·8	0·2	0·0	0·0	0·3	1·3	2·5	4·2
St. Louis	39	455	T.	31	34	34	56	66	75	79	77	70	58	43	36
			R.	2·3	2·8	3·4	3·5	4·2	4·5	3·4	2·7	2·9	2·4	2·9	2·2
Baltimore	39	170	T.	33	35	42	53	64	74	77	75	69	58	46	38
			R.	3·3	3·4	3·4	2·9	3·2	3·2	4·2	4·5	3·3	3·0	3·2	3·0
D. San Diego	33	50	T.	54	55	56	58	62	65	68	67	66	63	59	56
			R.	1·6	1·5	1·4	1·0	0·4	0·2	0·1	0·1	0·1	0·7	0·9	1·4
Vicksburg	32	292	T.	48	52	58	66	73	80	82	81	76	61	56	50
			R.	5·8	5·4	5·7	5·0	4·9	4·3	4·1	3·3	3·3	3·0	4·1	5·1
Charleston	33	23	T.	50	52	58	65	73	79	82	81	76	67	58	51
			R.	3·6	3·7	3·8	3·7	3·6	5·8	7·4	6·2	5·5	4·2	3·0	3·3
E. Colima	19	650	T.	69	70	74	77	81	81	79	79	78	77	75	72
			R.	0·5	0·0	0·0	0·0	0·7	6·8	7·1	6·7	7·4	4·1	0·5	0·1
Mexico	19	7,475	T.	54	57	60	64	65	64	62	62	61	59	56	53
			R.	0·2	0·2	0·6	0·6	1·9	3·9	4·1	4·7	4·1	1·8	0·5	0·1
Vera Cruz	19	50	T.	71	73	75	79	81	81	82	82	80	76	75	71
			R.	0·4	0·5	0·6	0·2	4·3	12·5	14·8	8·9	11·6	9·0	3·2	2·0
Colon	9	164	T.	79	79	79	79	79	80	79	79	79	79	79	79
			R.	3·9	1·5	1·6	4·3	12·2	13·2	16·7	15·3	12·7	14·1	20·0	12·1

In which part of a cyclone is the pressure lowest? Notice also that in a cyclone the pressure increases in all directions outwards from the centre.

10. Read question 15, Chapter IV, then place your tracing over Fig. 42, and at each of the places where the pressure is recorded on the map, draw an arrow in red to point towards the centre of low pressure. Now place your tracing over Fig. 43, which shows the actual direction of the wind at the time the observations were made. Do the arrows on Fig. 43 coincide with those which you have drawn? If not, are they deflected to the right or to the left of the red arrows? What effect has the rotation of the earth upon winds (*a*) in the Northern Hemisphere, (*b*) in the Southern Hemisphere?

11. Fig. 44 shows the isobars and winds on the same map. Notice the direction of the winds in different parts of the cyclone. In which part of the cyclone is air moving (*a*) from high to lower latitudes, (*b*) from low to higher latitudes. In winter the former give rise to **cold waves,** called "northers" in the southern states and "blizzards" in the northern states. Blizzards are usually accompanied by heavy snowfall and high winds.

Tornadoes and hurricanes are small cyclones with very low pressure at the centre.

12. Refer to your answers to questions 3 and 12b, Chapter IV, and explain why cyclones bring wet weather.

13. A cyclone is continually changing its position, i.e. the whole system of isobars and winds moves. As a rule, cyclones move in an easterly or north-easterly direction and follow well-defined tracks. These tracks are shown by thick black lines on Fig. 41. Place a tracing of Fig. 44 over Fig. 41, so that the centre of the

FIG. 41.

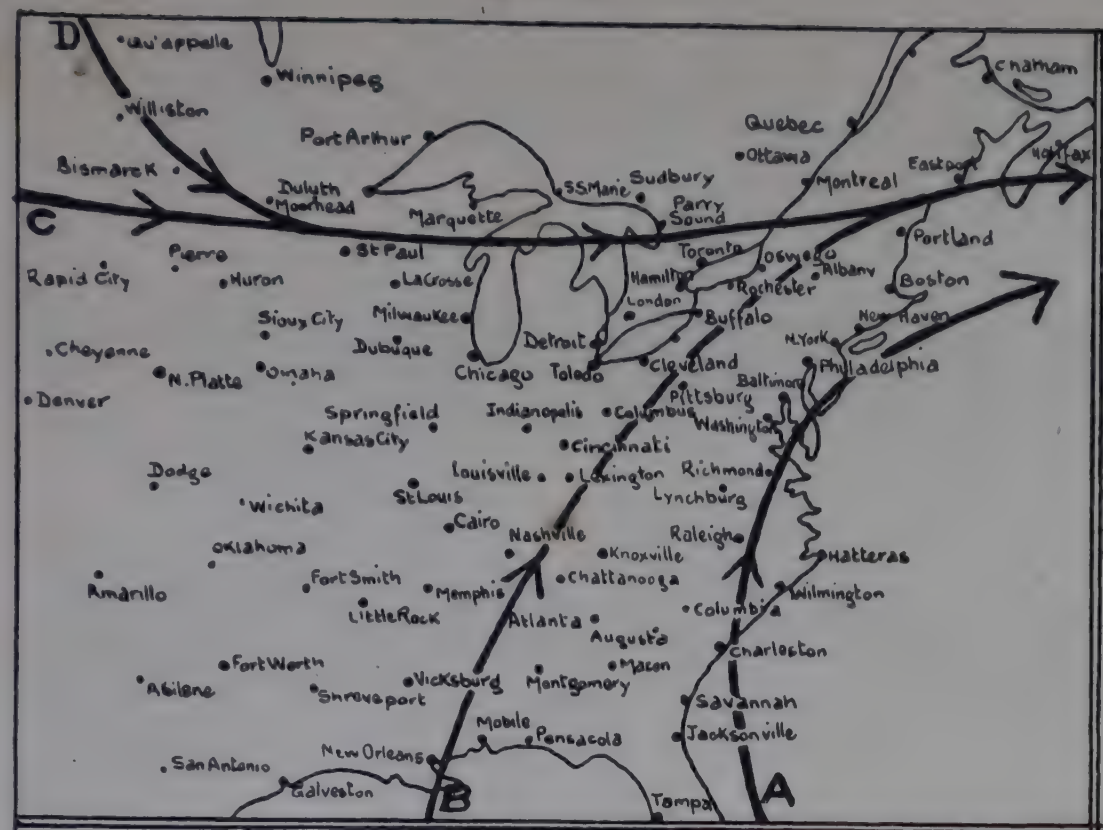
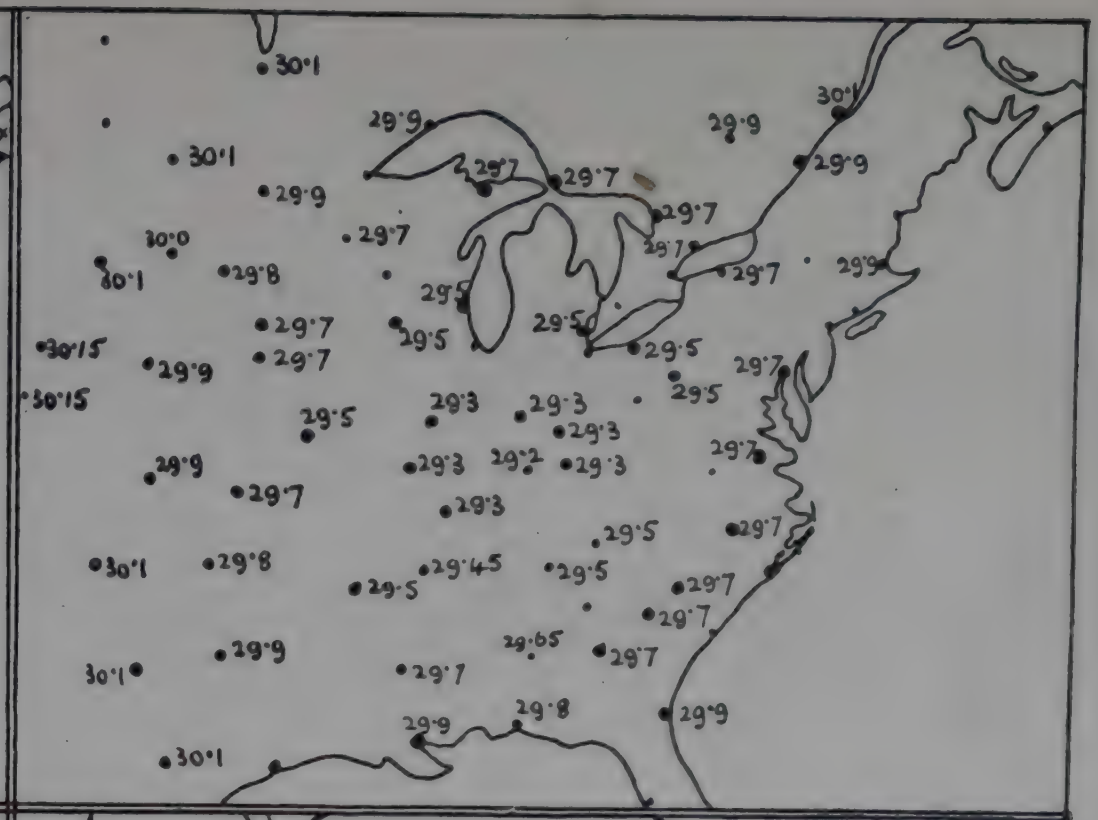


FIG. 42.



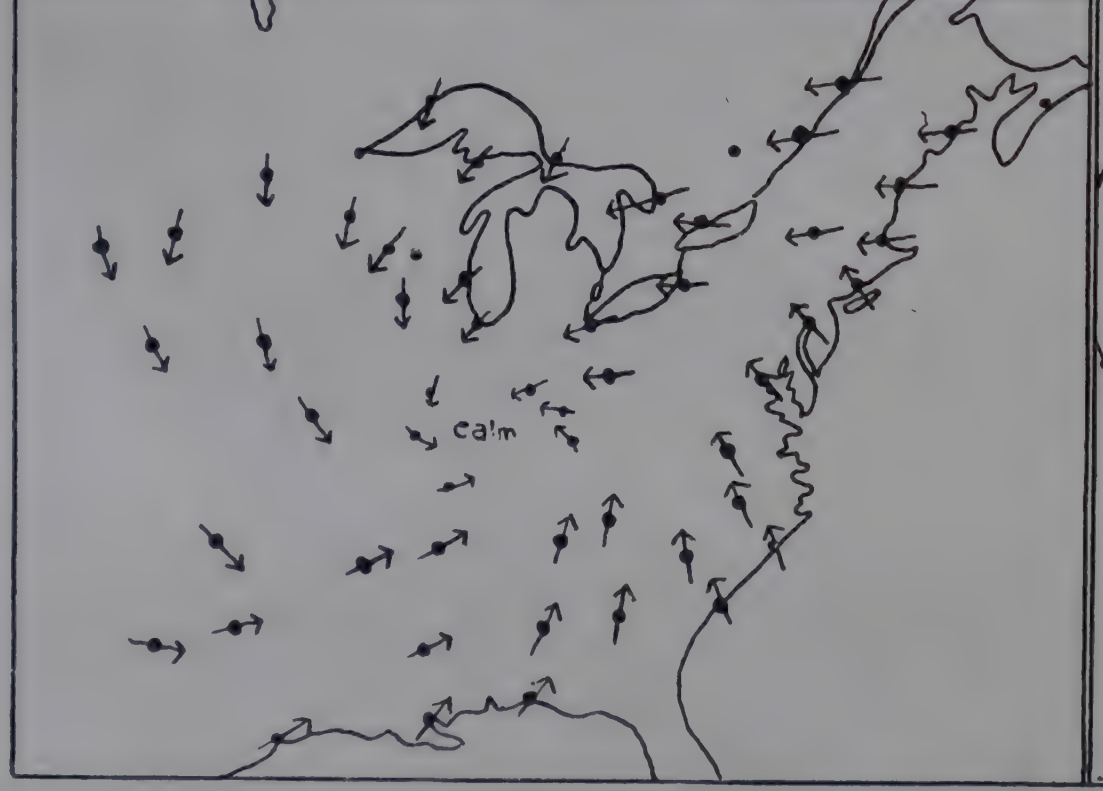


FIG. 43.

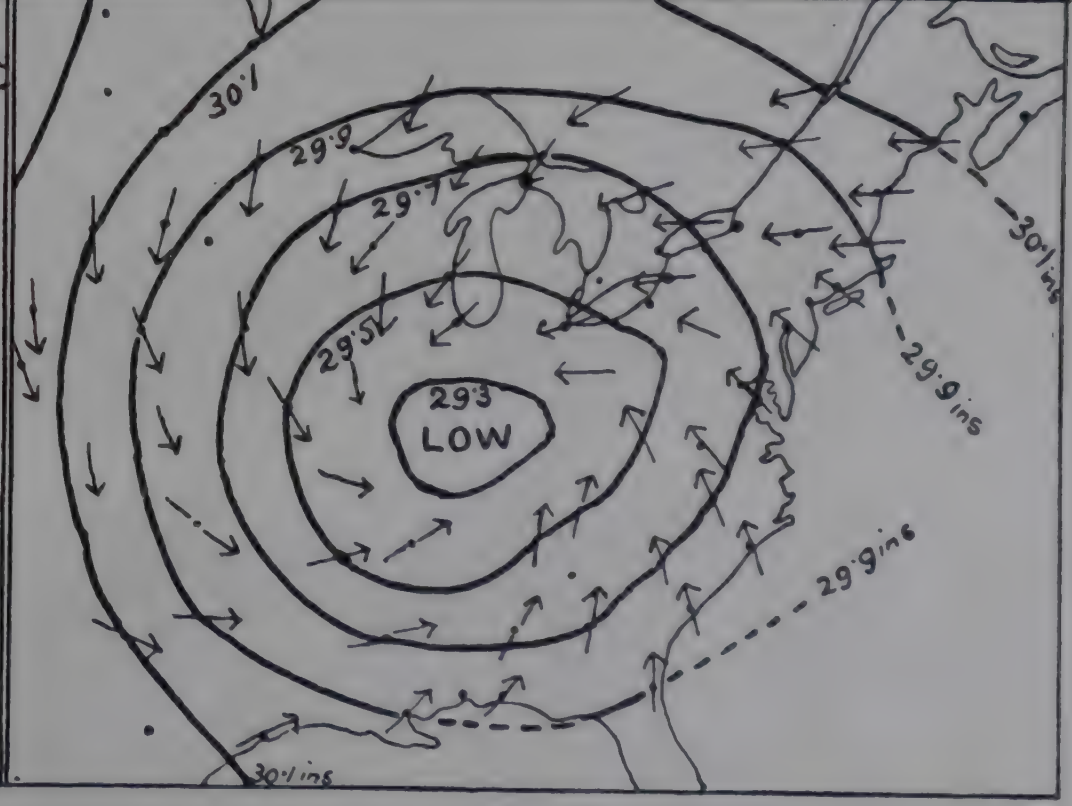


FIG. 44.

cyclone lies over New Orleans. Move the tracing along track B and notice the changes in the direction of the wind at St. Louis and New York as the cyclone moves towards the north-east.

Rainfall

14. Figs. 45 and 46 show the average position of the world's wind and pressure belts in January and July. Which are the wet belts?

Figs. 47 and 48 show the influence of relief upon the distribution of rainfall over the land.

Figs. 49 and 50 show, in addition to the influence of relief, the influence of summer heat and cyclones.

Figs. 51 and 52 are the actual rainfall maps for January and July.

Draw up a table to show the January and July rainfall of the towns named on page 28. Study Figs. 45 to 52 and your table carefully, and describe and account for the distribution of rainfall in January and July over (i) Canada, (ii) United States, (iii) Mexico and Central America, (iv) West Indies.

15. From Figs. 51 and 52 draw a map to show the regions which have (i) rain at all seasons, (ii) most rain in summer, (iii) most rain in winter, (iv) little or no rain at all seasons. Which parts of North America are included in the regions named above?

16. Examine the annual rainfall map (Fig. 37). Which parts of North America have the heaviest annual rainfall? Account for the difference in the amount of rainfall in different parts of British Columbia and Washington. Explain why the north of Canada has a light rainfall.

17. Fresno (lat. 36) in the Californian valley, has a mean annual rainfall of 9 ins., and the mean temperature for July is 82° F. Compare these figures with those for San Francisco and account for the difference.

18. The table given below shows the mean monthly snowfall at certain towns in North America.

Study the following figures in connection with the table and suggest reasons for the shortness of spring in the interior of Canada: if necessary refer to your answer to question 11, Chapter IV.

	Mean temperature.		Rise in temperature.
	March.	April.	
Winnipeg . .	12	35	23
Edmonton . .	22	41	19
St. Paul. . .	28	46	18
Quebec . . .	23	37	14
Victoria . . .	43	47	4
Greenwich (London)	41	45	4
Ruabon (School) .	43	45	2

19. Observe, whenever an opportunity occurs, (i) the influence upon plants of a mantle of snow during a hard frost, (ii) the hauling of logs over snow in winter, (iii) the influence of rapid melting of snow upon rivers, (iv) influence of a heavy fall of snow upon transportation by road and rail, (v) the influence of a mild and of a hard winter upon farming operations.

20. From what you have learned in this chapter you should have no difficulty in understanding the following statements:

(i) The moisture-laden westerly winds from the Pacific are forced upwards when they reach the mountains. As they rise they are cooled and rain falls.

(ii) The condensation of the water vapour liberates the heat absorbed during evaporation, and this liberated heat counteracts the cooling mentioned in (i).

(iii) If, for any reason, the ascending air is forced to descend again, its temperature and water capacity are raised considerably.

Now place a tracing of Fig. 44 over the relief map of Canada in your atlas so that the centre of the cyclone lies to the west of Winnipeg.

Snowfall Statistics.

Snowfall is given in inches.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Victoria (B. C.) .	6·3	4·5	1·5	—	—	—	—	—	—	—	1·5	0·5	14·3
Winnipeg . .	8·2	8·7	9·0	3·8	1·3	—	—	—	—	2·5	10·0	8·3	51·8
Edmonton . .	6·5	7·1	6·7	3·4	1·3	0·1	—	0·1	0·8	3·5	6·8	7·0	43·3
Montreal . .	31·4	26·1	19·5	5·3	0·1	—	—	—	—	1·4	11·7	25·2	120·7
St. John (N. B.) .	21·4	19·2	14·7	6·2	0·3	—	—	—	—	0·5	5·3	13·4	81·0
Quebec . .	30·7	27·3	19·9	6·4	0·4	—	—	—	—	1·5	14·2	25·2	125·6

FIG. 45.

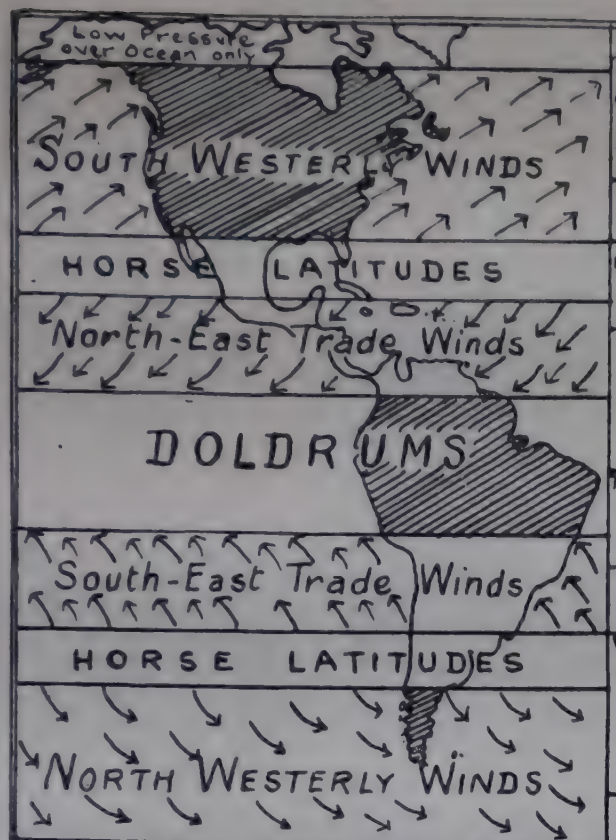


FIG. 46.

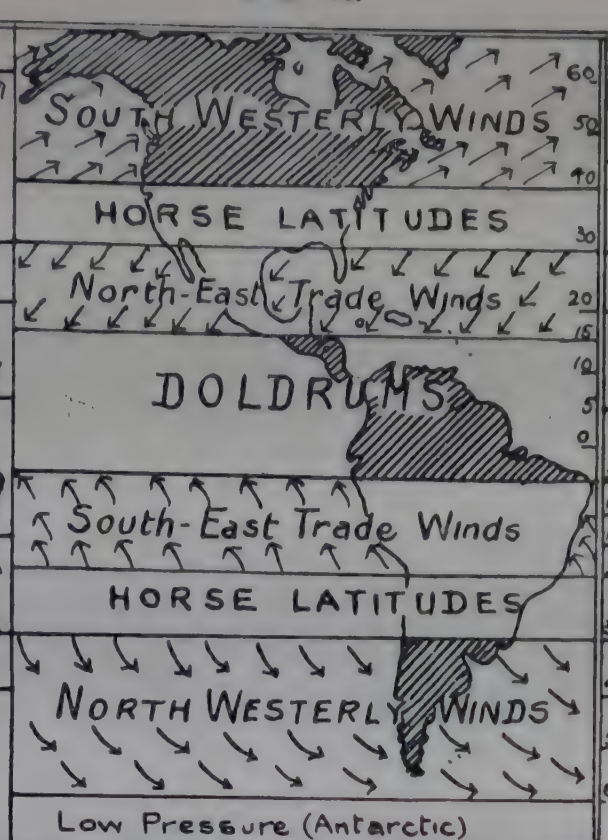


FIG. 47.

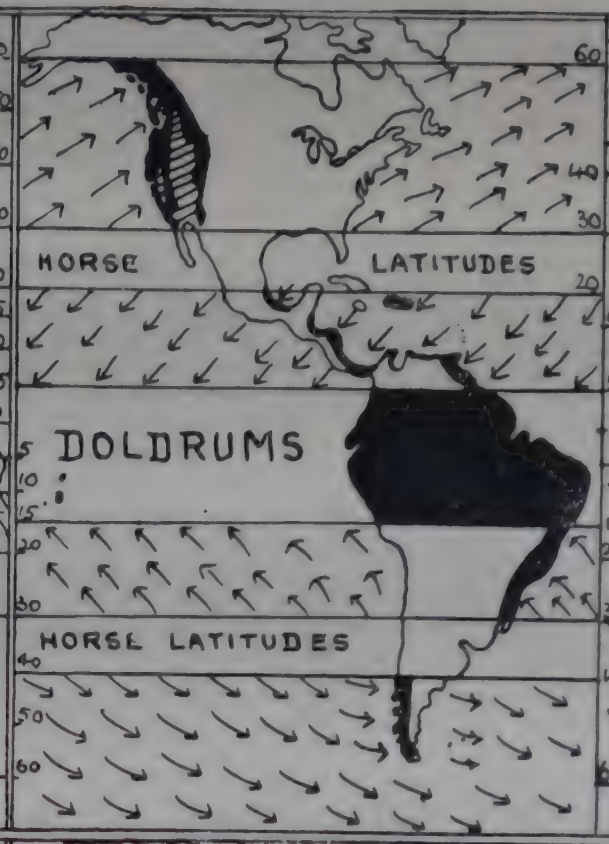


FIG. 48.

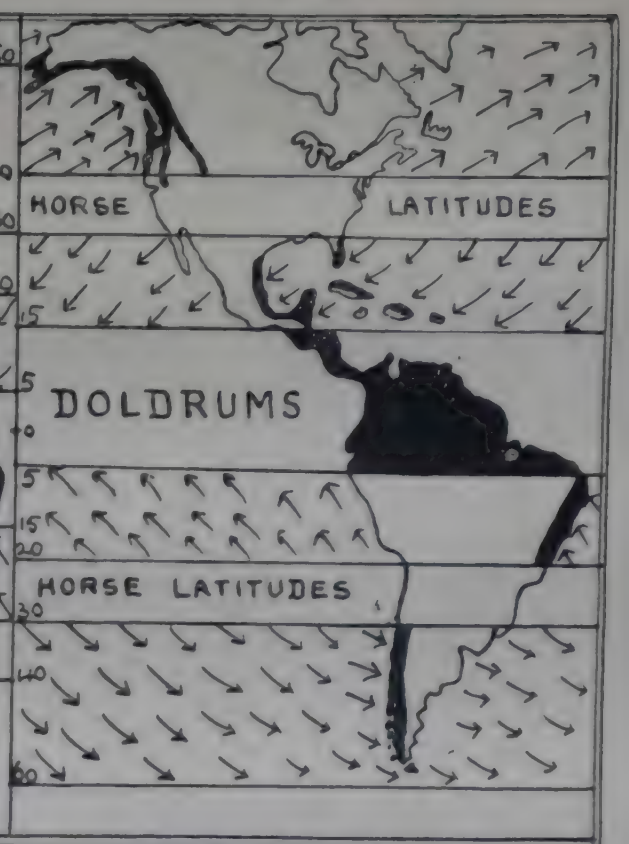


FIG. 49.

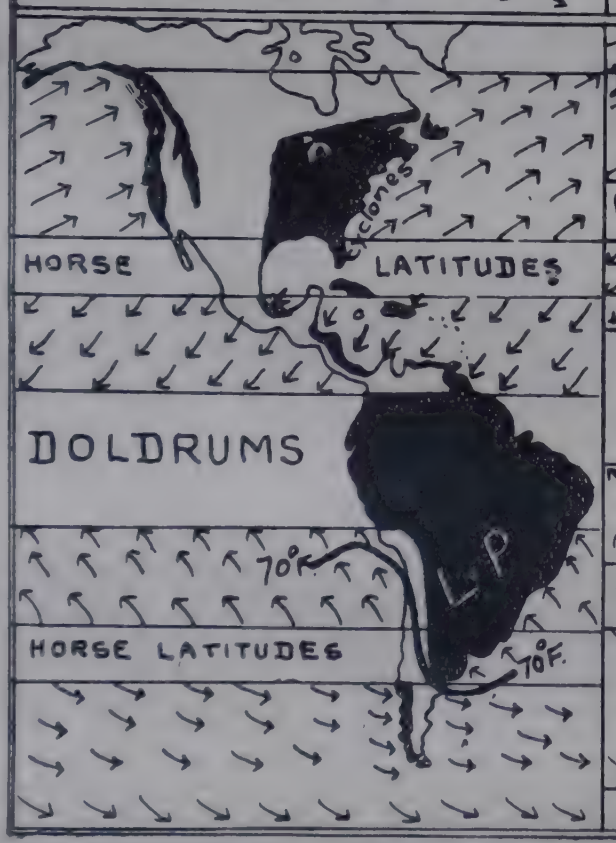


FIG. 50.

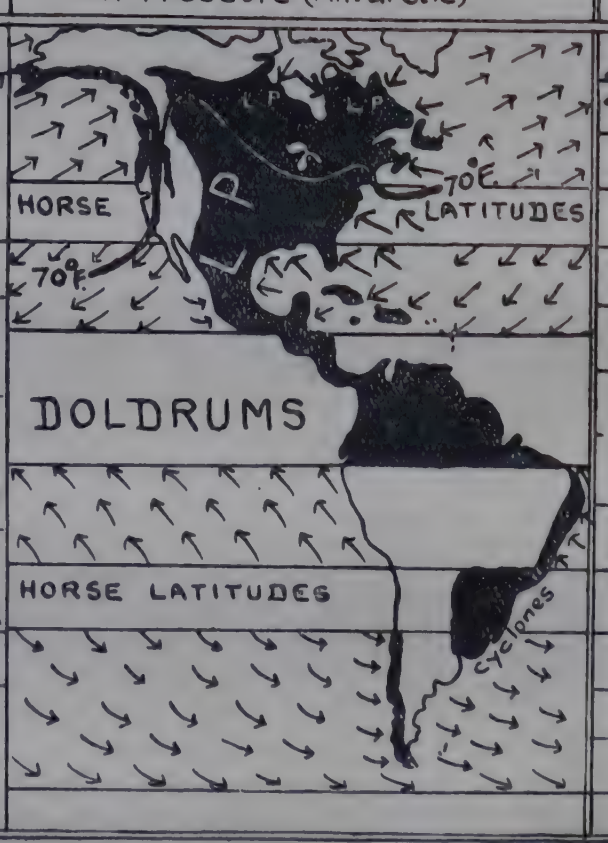


FIG. 51.

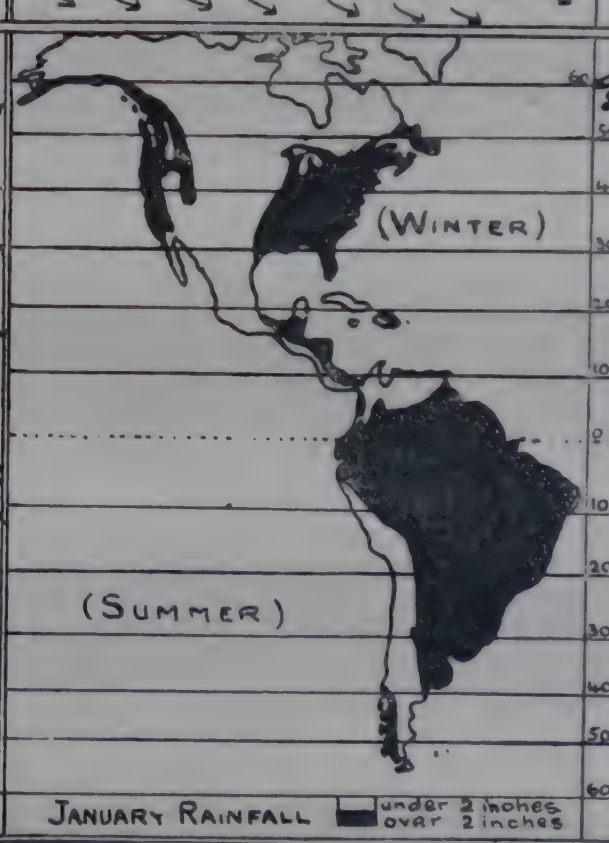
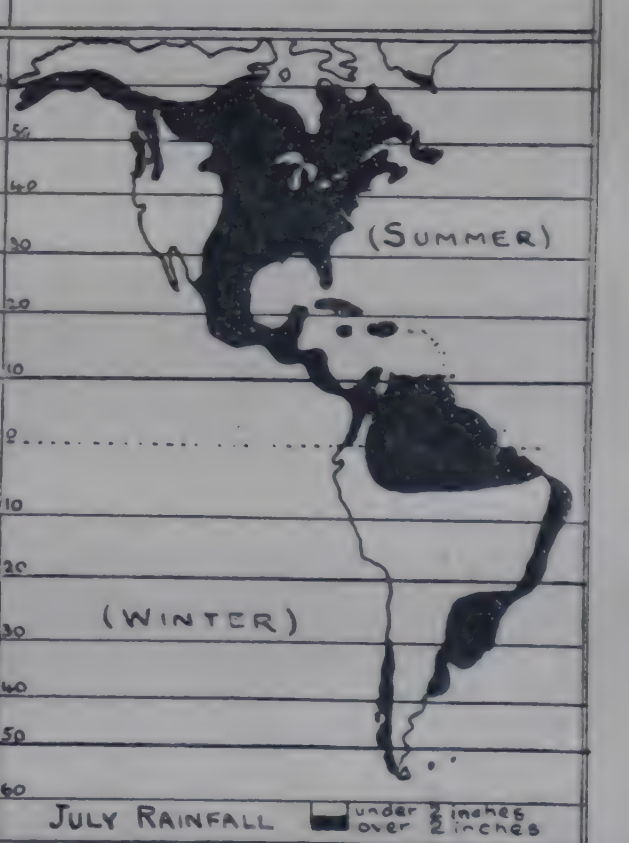


FIG. 52.



Signs.

A	Asbestos
▨	Coal
C	Copper
G	Gold
▲	Iron
L	Lead
N	Nickel
P	Petroleum
Ph	Phosphates
Q	Quicksilver
S	Silver.
Z	Zinc.

Sulphur

MINERALS.

FIG. 53.

What is the direction of the winds in Alberta and Montana, that is, to the rear of the cyclone? Explain, in your own words, why these winds are warm.

21. These winds, which descend from the Rocky Mountains, are called Chinook winds, and are an important feature of the climate of Montana and Alberta. They have been known to cause the temperature to rise 80° F. in seven hours and 43° F. in fifteen minutes, and to cause heavy falls of snow to disappear in a few hours.

In which parts of South America and New Zealand would you expect similar winds to develop? Give reasons for your answer.

Vegetation

22. Which of the vegetation regions already familiar to you are marked on Fig. 38? Draw up a table showing which parts of North America, South America, Africa, and Australia have similar types of vegetation.

***23.** Describe the climate and characteristic vegetation of the tundra. Explain the absence of trees and grass in this region.

24. Read selected passages from books of travel describing the vegetation of different parts of North America and describe the character of the natural vegetation passed through in crossing (*a*) British North America from British Columbia to Newfoundland along the 50th parallel, (*b*) the United States from San Francisco to Charleston, (*c*) Mexico from Mazatlan to Tampico.

***25.** Where and what are the bad lands, barren grounds, everglades, dismal swamp, Llano Estacado?

***26.** Write notes on the following trees: Douglas fir, white pine, yellow pine, spruce, maple, hickory, cedar, mahogany. Explain what is meant by sage brush and buffalo grass.

27. Conifers can thrive in lower temperatures and on poorer soils than deciduous trees. Is this true of your own district? Explain why coniferous forests are found on the Atlantic and Gulf coastal plains where the winters are not cold and abundant rain falls at all seasons.

28. Draw a diagram to illustrate the zones of vegetation on a high mountain in Central America.

29. Name four plants, native to America, which are now cultivated extensively in other parts of the world.

***30.** Find in an encyclopædia or elsewhere an account of the native animals of North America. Write short notes on (*a*) the chief fur-bearing animals of the Canadian forest, (*b*) the animals of the tundra and Arctic region.

31. Fig. 53 shows the regions in which minerals are known to exist. The mineral wealth of the United States is fairly well known, but it is impossible to estimate the mineral wealth of Canada, because large areas of the country are still unexplored. The known mineral wealth is enormous, and includes almost inexhaustible supplies of coal and iron.

With the help of Fig. 53 draw up a table showing the mineral resources of (*a*) British North America, (*b*) United States, (*c*) Mexico. Notice particularly the absence of coal in Quebec and Ontario.

32. Draw a map to show the position of the coalfields of Canada and the United States. Enter the names of towns which are situated near the coalfields.

CHAPTER VI

HISTORY, PEOPLE

Hy. 1. "THE cutting off of Europe's supply of spices, nutmegs, and cinnamon sent Columbus to America." Discuss this statement.

Hy. 2. Mark on an outline map the extent of the possessions of Spain, France, and England previous to the Seven Years' War. State how the relief features affected the expansion of the French and English in North America.

On the map you have drawn in answer to question 2 mark in different ways the names which are of Spanish and French origin. What do you notice as to their distribution?

Hy. 4. "Most of the English settlements in North America were communities which had left England because of religious or political dissensions." Discuss this statement and explain how the origin and geographical position of the colonies kept them independent and mutually jealous.

5. Suggest reasons why the English won their way on this continent against both Spanish and French.

6. Pitt's plan of attack upon Quebec was as follows: One force was to move up the St. Lawrence. Three other forces were to proceed from their headquarters at Albany, one down the Richelieu to Montreal, one up the Mohawk to Lake Ontario and then down the St. Lawrence, and the third to Fort Dusquesne. How does this plan illustrate the importance of the relief features? Describe the position of Quebec.

Hy. 7. Summarise the chief results upon America of the European wars from the Treaty of Utrecht to the close of the American Revolution.

Hy. 8. Explain how (*a*) the Act of Union of England and Scotland in 1707 and (*b*) the Industrial Revolution affected the flow of Scottish and English emigrants to America.

Hy. 9. "The capitulation of Saratoga decided the result of the American War of Independence." Comment upon this statement.

Hy. 10. Discuss the real causes of the War of American Independence. How did the result of this war affect Canada? Write notes on the "United Empire Loyalists."

11. Trace the history of the Spanish possessions in North and Central America. Read the story of the conquest of Mexico.

F. 12. Translate:

Les anciens habitants du Mexique étaient des Indiens Peaux-Rouges, qui vivaient primitivement en tribus. Avant l'arrivée des Espagnols, les Astèques, qui étaient les plus puissants maîtres du Mexique, formaient un état organisé, mais après la conquête, les nobles espagnols se saisirent les grands propriétés et condamnèrent le peuple aux travaux pénibles des mines et des plantations.

Au commencement du dix-neuvième siècle le Mexique se gouverna lui-même, mais les Indiens ne tirèrent aucun bénéfice de la rebellion et travaillèrent encore pour des maîtres. Présentement, quinze millions d'individus vivent sur le Mexique. L'état a construit des chemins de fer pour unir les régions du centre aux provinces minières et aux ports. Mais les Mestizos et Espagnols partagent seuls avec les entrepreneurs anglais et américains le bénéfice de ces travaux.

(*b*) Les Espagnols ont soumis l'Amérique centrale avec le Mexique, et l'ont exploitée pareillement. Avec l'aide du Mexique les provinces secouèrent le joug espagnol, mais la liberté ne donna pas le bonheur aux pays délivrés. Chaque groupe de population, enserré dans sa montagne, voulait dominer les autres. Ainsi, sous d'autres noms, sous d'autres formes, la servitude et l'anarchie règnent encore dans ces contrées: cependant la population s'y est accrue notablement, mais elle n'est pas travailleuse et ne recherche aucun progrès. Le chaleur du climat a rendu les indigènes indolents.

(*c*) Les Espagnols qui occupèrent les premiers les Antilles commencèrent par faire travailler les indigènes, mais ceux-ci n'étaient pas en nombre suffisant. Alors commença l'esclavage de millions de nègres. Le même régime continua après que les îles furent partagées par les puissances maritimes de l'Europe. Cependant les idées d' humanité se développaient. En 1832 Wilberforce fit abolir l'esclavage aux Antilles anglaises: en 1886 l'Espagne décréta l'eman-

cipation. Depuis l'abolition de la servitude la population a augmenté partout.

13. Draw a full-page map of Central America, showing the political units and their capitals.

In 1921 Honduras, Guatemala, Nicaragua, and Costa Rica decided to form a new state to be known as the Federation of Central America, but the decision has not yet been carried out.

14. Draw a map of the West Indies. Name the chief islands and the country to which each island belongs. Which of the islands are independent?

15. "The development of a country depends upon its people and the development of a people depends upon the country. Land and people develop together: each affects the other. Human communities cannot be studied apart from their environment."

Illustrate the truth of this statement from the history of your home country or home region.

***16.** Although Norse sailors reached the shores of Canada in the year A.D. 1000, the natives of North America did not come into effective contact with the outside world until Europeans settled on the continent about 500 years later. Nowhere, therefore, is it possible to see more clearly the influence of environment upon man and the extent to which man, unaffected by contact with other peoples, was able to modify, to his own advantage, the conditions of life as determined by nature.

Describe the life of (*a*) the Eskimos, (*b*) the Indians of the Northern forests, (*c*) the Pueblo Indians, (*d*) the Aztecs of Mexico. In each case show the influence of environment upon the food, clothing, dwelling, utensils, weapons, occupations, means of transport, density of population, and form of society.

***17.** Describe the efforts made by the governments of Canada and the United States for the welfare of the Indians. Why have they largely failed?

***18.** Write an account of the beginnings of slavery in America. Why was it more successful in the south than in the north? Describe the present intellectual condition of the negro population in (*a*) the United States, (*b*) the West Indies.

19. Draw a map of the states named below. Shade the map to show the distribution of negroes from the figures contained in the table.

State.	No. of negroes, 100,000.	State.	No. of negroes, 100,000.
Georgia	15	Tennessee	5
Mississippi	14	Arkansas	5
Alabama	11	Florida	4
South Carolina	9	Kentucky	3
Louisiana	8	Maryland	3
North Carolina	7	Oklahoma	2
Virginia	7	Pennsylvania	2
Texas	7		

***20.** Discover the meaning of the words: creole, peon, mulatto, mestizo, zambo.

21. Suggest reasons for the backward state of Mexico and Central America. Compare the existing conditions with those of Colombia, Ecuador, and Venezuela.

***22.** Some thousands of Chinese and Japanese have emigrated to British Colombia and California. State the present attitude of the home governments towards these people.

23. Express the facts contained in the following table in the form of a diagram.

	Population in millions.
British North America	9
United States	106
Mexico	16
Central America	5
West Indies	6½

24. The relation between the growth of population and the railway development may be judged from the following table:

CANADA.			UNITED STATES.		
Year.	Population.	Railways.	Year.	Population.	Railways.
	Millions	Miles.		Millions	Miles.
1851	1·8	66	1850	27·0	9,021
1861	3·1	2,065	1860	31·4	30,635
1871	3·5	2,617	1870	38·5	52,914
1881	4·3	7,194	1880	50·2	93,296
1891	4·8	13,151	1890	62·9	163,597
1901	5·4	17,657	1900	76·0	193,347
1911	7·2	24,731	1910	92·0	249,992
1921	8·8	39,196	1920	105·7	263,821

Draw graphs to show comparatively the growth of population and the development of railways in Canada. Draw similar graphs for the United States.

CHAPTER VII

CANADA AND NEWFOUNDLAND

INDUSTRIES, COMMERCE, POPULATION

1. "THE stage of industrial development reached in the different parts of a new country is largely indicated by the density of the population." Give examples from the Argentine, Australia, and New Zealand to support this statement.

Hunting

2. Hunting is an occupation which is confined to the tundra, forests, scrub, and mountain regions of the world, and is usually carried on by backward races. The trapping of the fur-bearing animals of the forests was one of the chief occupations of the first Europeans to arrive in Canada, and many white men are still engaged in this occupation. Write a short account of the history and present activities of the Hudson Bay Company.

3. Distinguish between fur markets and trading posts. Draw a map of Canada to show the regions which have less than one inhabitant per square mile (see Fig. 39). Hunting is practically confined to these regions. Mark on the same map (i) the boundaries of the tundra, forests, and grass lands; (ii) the names of the fur-bearing animals; (iii) the chief fur markets —Edmonton, Winnipeg, Montreal, Vancouver; (iv) some of the trading posts.

Fishing

4. The shallow waters of the continental shelf teem with fish. The shelf provides the fish with suitable spawning grounds, and with an abundance of food derived from the vegetation which grows upon the shelf and from the food materials deposited upon it by rivers and currents.

Although fishing is carried on wherever people live near water, fishing became an important industry at an early stage in countries bordering a continental shelf, where most or all of the following conditions prevailed: (*a*) infertile soil, and climate too cold and damp for agriculture; (*b*) an irregular coast, affording an abundance of safe harbours; (*c*) access to forests of easily-worked timber for boat-building, boxes, and barrels; (*d*) accessible markets.

In which parts of British North America are the above conditions found?

5. The value of the fisheries fluctuates from year to year, but the relative importance of the fisheries in the different parts of British North America may be gathered from the following table:

Total Value of Fishery Products
(£10,000,000)

Newfoundland	35%
British Columbia	30%
Nova Scotia	15%
New Brunswick	10%
Ontario	4%
Quebec	3%
Prince Edward Island	1%
Remainder	2%

Express the above percentages in the form of a diagram.

6. Write an account of the fishing industry (including sealing) of Newfoundland. What are the chief kinds of fish caught? Explain why most of the people of Newfoundland are engaged in this industry.

7. Account for the high value of the fishery products of British Columbia.

Lumbering

8. The forests of Canada form one of the world's great forest reserves. No other country possesses such a wealth of marketable timber. One third of the Canadian forests consists of the exceptional timber of British Columbia.

Compare the vegetation map with the political map. Notice that all the provinces contain forests. Estimate what fraction of the total area of (i) Alberta, (ii) Saskatchewan, (iii) Manitoba, is covered with forest.

9. Prince Edward Island has now no forests. In fact, the forests have been cleared almost entirely from those parts of Canada where the number of inhabitants is over thirty-two per

sq. mile. Examine the population map (Fig. 39) and give the position of the cleared lands. If you compare the extent of the cleared lands with that of the forest you will see that, as yet, only the fringe of the forest has been touched.

10. Lumbering is actively carried on at the margins of the cleared lands and on the Selkirk and Coast ranges of British Columbia. What advantages do Ontario, Quebec, New Brunswick, and British Columbia possess for carrying on the lumber industry? Much of the timber of British Columbia goes to Alberta.

11. "Were it not for the hard frosts and snow it would be impossible to carry on lumbering operations in Eastern Canada." Discuss this statement.

12. Most of the paper used to-day is made from tree trunks. Cardboard and "beaver" boards are also made from the same material. The grinding of wood into pulp has, therefore, become an important industry in the northern forests. Hundreds of wood-pulp and paper mills are situated in the lumbering regions of Canada and Newfoundland, where water-power is available. Sault S. Marie, Hull, Ottawa, Three Rivers, Quebec, and Vancouver are some of the chief centres of the industry. Express the following statistics graphically:

WOOD-PULP PRODUCTION (1918)

	Tons.
Quebec	802,000
Ontario	505,000
British Columbia	173,000
New Brunswick	66,000

PASTURING

13. Revise the following facts and illustrate the truth of each by examples drawn from your own district, Australia, New Zealand, or the Argentine:

(*a*) Beef cattle are reared on grasslands which are either too dry for agriculture or are untilled because there are no railways at hand. They are later removed to the grain-growing lands to be fattened for slaughter.

(*b*) Milch cows, which provide daily supplies of fresh milk, are kept on the moist lands which are within reach of densely peopled regions. (Surplus milk is converted into butter or cheese).

(*c*) Milch cows, whose milk is converted into butter, cheese, or condensed milk, may be kept at a greater distance from the market.

(*d*) Sheep, reared for their wool, are found in the sparsely peopled regions, which are too dry or too rough and hilly for agriculture.

(*e*) Sheep, reared for their mutton, are fattened on richer pastures, near the grain lands.

(*f*) Horses are of great importance in agricultural regions, where they are largely reared.

(*g*) Pigs are animals of the grain lands. They are also reared in dairy-farming regions.

(*h*) Hay or alfalfa, barley or maize, and oats are important crops where animals are reared. The provision of winter food for animals is important in cool temperate lands.

14. Although relief, climate, and soil largely control the general distribution of the pastoral and agricultural occupations, several other factors must be taken into consideration before it is possible to account for the actual distribution of particular animals and crops.

Show how each of the following factors has effected changes in the relative importance of specific animals and crops in regions you have already studied:

(*a*) Improvement in transport facilities (including the refrigerator ship and hermetically sealed cans for perishable foods).

(*b*) Change in the value of a product owing to increased or decreased demand.

(*c*) Change in density of population.

(*d*) Competition of more favourably situated regions.

(*e*) Introduction of new methods or new breeds.

15. Particulars of the live stock of Canada and Australia for 1921 are given below for comparison.

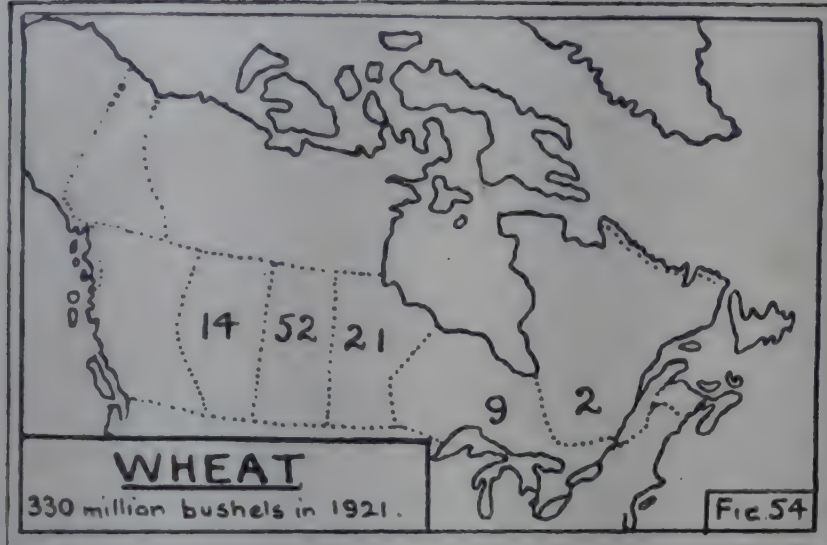
	Canada.	Australia.
Cattle	10,200,000	13,500,000
Sheep	3,600,000	77,900,000
Pigs	3,900,000	700,000
Horses	3,800,000	2,400,000

There are as many sheep in Wales as in the whole of Canada. Suggest reasons why Canada is not an important sheep-rearing country.

16. The percentages of the total number of live stock contained in each of the provinces of Canada are shown in Figs. 58 to 61. Percentages of the total yield of the principal crops are also shown on the same page. Represent graphically the percentage of the total number of (i) cattle, (ii) horses, (iii) sheep, (iv) pigs, in each province.

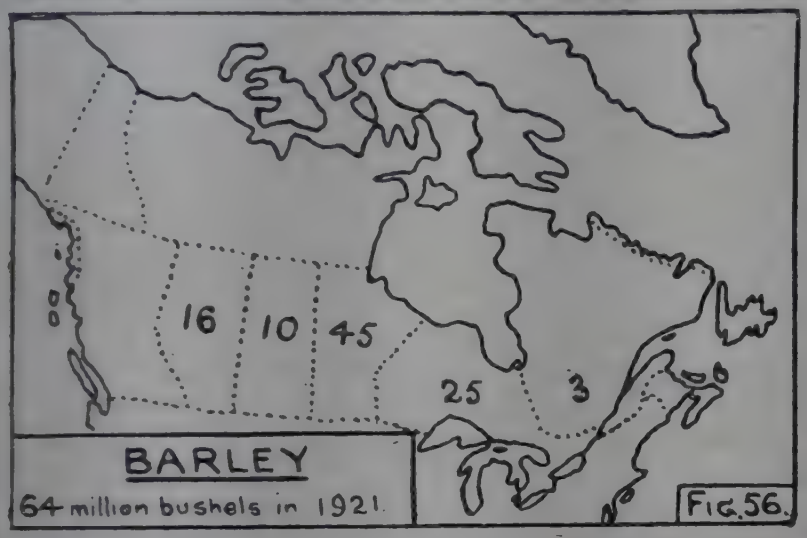
17. What special feature of the climate enables cattle and horses to graze all the year round in Alberta and the extreme west of Saskatchewan?

18. In 1921 the total output of Canadian butter was 128 million lbs, and of cheese 162

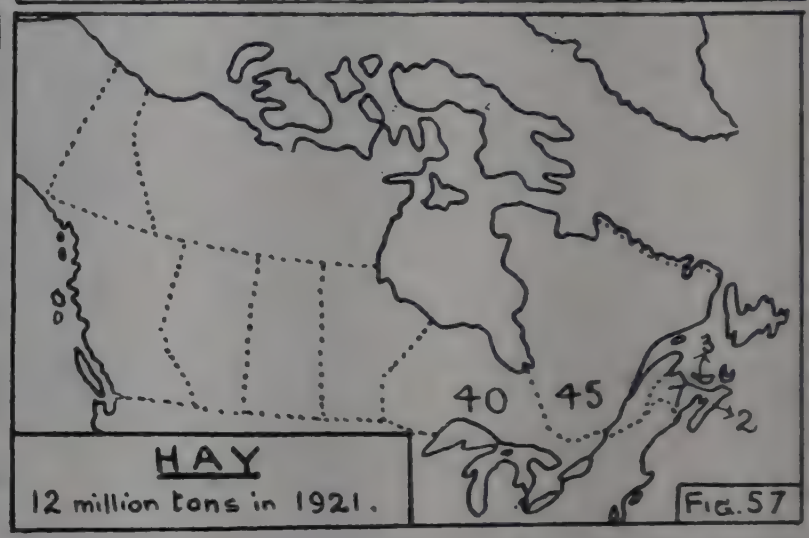


WHEAT
330 million bushels in 1921.
Fig. 54

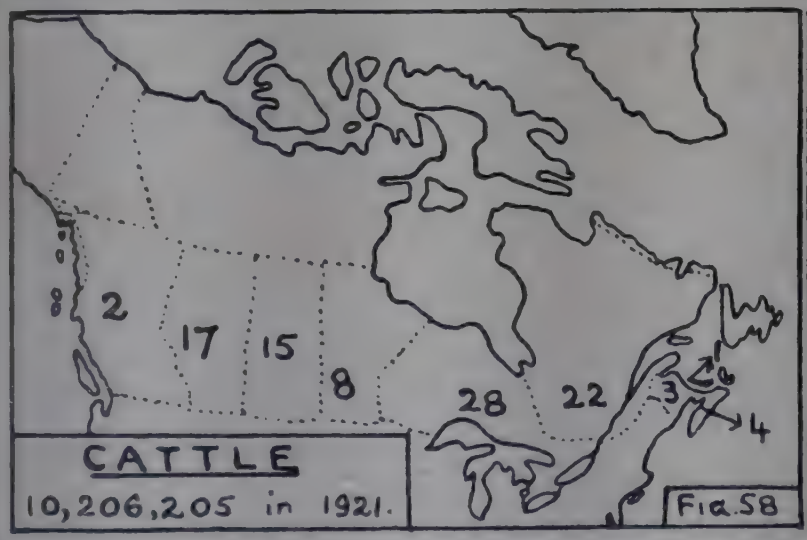
OATS
510 million bushels in 1921.
Fig. 55



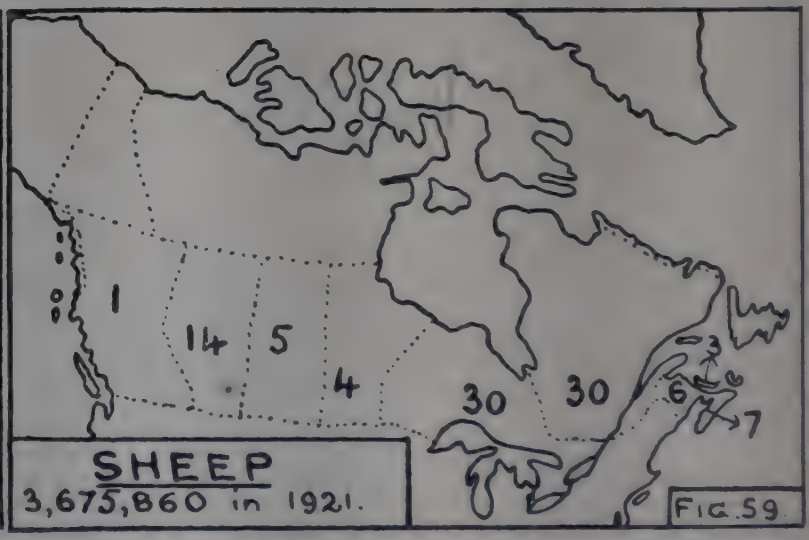
BARLEY
64 million bushels in 1921.
Fig. 56.



HAY
12 million tons in 1921.
Fig. 57

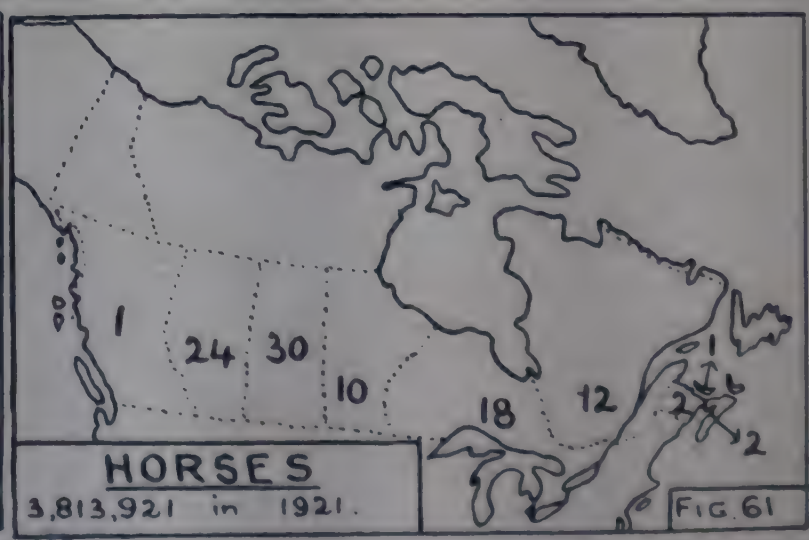


CATTLE
10,206,205 in 1921.
Fig. 58



SHEEP
3,675,860 in 1921.
Fig. 59

PIGS
3,904,895 in 1921
Fig. 60



HORSES
3,813,921 in 1921.
Fig. 61

million lbs. The average percentage of the total output for each province is shown below:

	Butter.	Cheese.
Ont. . . .	33	64
Que. . .	40	31
N. S. . . .	2	—
N. B. . .	1	1
P.E.I. . .	1	1
Man. . . .	7	—
Sask. . .	3	1
Alta. . . .	10	1
B.C. . . .	3	—

Express the above percentages graphically.

19. With the help of the particulars shown in Figs. 58 to 61, and of the information contained in questions 13 and 14, write a short account of the distribution of live stock in Canada.

Agriculture

20. Draw up a table showing in which parts of South America, Africa, Australia, and New Zealand the following crops are grown, and revise the facts given below relating to the conditions which determine their cultivation:

Wheat

The best regions for the cultivation of wheat are lowlands, with fairly stiff soil to support the stalk and retain some moisture about the roots. Moderate rain and cool weather are necessary during the period of growth, and warm, dry sunny weather is required for ripening the grain. As in the case of all other products, there must be transport facilities for marketing the grain. In the warmer parts of the temperate zone, where the summers are hot, wheat is harvested in early summer, and sown in late autumn.

Oats

Oats grow well in regions where the summers are cool and moist, and succeed in a greater variety of soils than wheat. Hot, dry summers are unsuitable. Oats may be successfully grown in maize regions if harvested at the beginning of summer. The chief use of oats is as a food for horses.

Barley

Barley grows best in the same regions as wheat, but it has a shorter growing season and can endure greater aridity and a lower temperature than wheat. It extends over a wider climatic range than any of the other grains. Its chief use is as food for live stock and for making malt. Like oats, it is an important crop in regions which cannot grow maize.

Maize

Maize grows best in warmer regions than wheat, but it is also largely grown in the warmer parts of the wheat regions, if the rainfall is sufficient. Maize requires hot, sunny summers, with frequent rain showers. It is an excellent food both for man and beast, but it is chiefly used to feed cattle and pigs. Owing to its low price and the high value of meat, maize is largely used to fatten live stock in those areas where the plant is grown.

Flax

Flax for seed is grown best in regions suitable for wheat. The seed, upon being crushed, yields linseed oil. The " oil-cake " that remains is an important food for live stock.

Hay

Hay is an important crop wherever domestic animals must be stall-fed during part of the year. It is of especial importance in regions which experience severe winters.

Alfalfa

Alfalfa is a clover, and is one of the best hay plants. It is an important crop on irrigated lands in semi-arid regions. It can withstand months of drought and grows with very little rainfall.

Sugar Beet

Sugar beet requires a moderate amount of spring and summer rain, moderate heat and a cool dry autumn. It will grow in poor soil if well manured. A large amount of hand labour is required for weeding, hoeing, etc. The refuse is highly valued as a cattle food.

Tobacco

Tobacco grows best where there is lime in the soil. It has a wide range of climate, but is injured by frost. As it grows in a short season, it can be cultivated in cool temperate latitudes, but the leaf of the hotter regions makes the best cigars. Picking and sorting of the leaves demand a large amount of hand work.

Vine

The vine requires summers of moderate heat It requires sunshine, but not too much moisture,

and grows well on the irrigated lands of "Mediterranean" regions.

Deciduous Fruits

Apples, pears, plums, thrive in cool temperate lands, where the winters are not long and severe.

21. Express graphically the percentages shown in Figs. 54 to 57 relating to wheat, oats, barley, and hay. Why is such a large quantity of hay grown in Ontario and Quebec?

22. Explain fully the different geographical conditions which favour wheat growing in the Canadian prairies.

23. The yield of the principal Canadian crops in 1921 was as follows:

	Million bushels.		Million tons.
Wheat	330	Hay	11·5
Oats	510	Alfalfa	·7
Barley	64	Sugar beet	·3
Maize	14		
Potatoes	111		
Flax	4		
Turnips	75		

The distribution of crops other than those shown in Figs. 54 to 57 is given below:

Potatoes	All provinces.
Hay	Eastern provinces.
Maize	Lake Peninsula (Ont.), 95%; South Quebec, 5%.
Tobacco	Lake Peninsula, 49%; South Quebec, 50%.
Flax	Saskatchewan, 83%; Manitoba, 15%.
Sugar Beet	Alberta, Ontario, British Columbia.
Alfalfa	Alberta.
Grapes	Northern shores Lake Erie (Ont.).
Deciduous fruits.	Eastern Provinces (especially N.S. and Ont.); British Columbia.

Draw up a table showing the chief agricultural products of each province.

24. Describe the geographical conditions which favour the cultivation of maize, tobacco, grapes, peaches, and apricots in the south of the Ontario peninsula.

25. What is meant by "mixed farming"? Why is mixed farming more common in Ontario than in Saskatchewan?

Mining

26. Read the section which refers to Canada, in your answer to question 31, Chapter V.

It is estimated that Canada possesses one seventh of the world's known coal reserves, and that four fifths of this coal is in Alberta. The full development of the mineral resources of Canada, however, awaits improved transport facilities and an increased population. At present, agriculture and forestry are far more important industries than mining.

27. The relative importance of Canadian minerals may be judged from the following table:

TOTAL VALUE OF MINERAL OUTPUT, 1921, £34 MILLIONS

	Percentage of Total.		Percentage of Total.
Coal	53	Asbestos	4
Gold	14	Lead	3
Silver	6	Zinc	2
Nickel	5	Iron	1
Copper	5	Petroleum	1

Express the above percentages graphically.

28. Mark on a large outline map of Canada and Newfoundland the position of the following mining centres. Insert also the initial letter of the mineral referred to, e.g. G. for gold. Represent coal by a cross (+) and natural gas by a circle (○):

Gold	Dawson City, Rossland.
Silver	Cobalt, Rossland.
Copper	Sudbury, Rossland, Newfoundland.
Zinc	Rossland.
Lead	Rossland.
Asbestos	Thetford.
Nickel	Sudbury.
Gas	Regina.
Iron	Cape Breton Island, Pictou, Michipicoten, Newfoundland.
Coal	Cape Breton Island, Pictou, Lethbridge, Banff, Fernie, Nanaimo.

Manufactures

29. Within recent years manufacturing has attained a position of considerable importance, due largely to (*a*) developments in the use of water as a source of power, (*b*) a growing home market, (*c*) assistance of the Dominion Government, (*d*) the Great War. Comment upon each of the above reasons.

30. Except in the largest cities, manufacturing has not gone beyond the stage in which the simplest processes are applied to the raw material of the country.

Mark on the map which you have drawn in answer to question 3 the following manufacturing centres:

Leather	Quebec, Fredericton.
Matches	Ottawa.
Machinery	Toronto, Montreal, Winnipeg, Hamilton, London.
Canneries	New Westminster, St. John's.
Meat packing	Toronto, Edmonton, Charlottetown.
Flour milling	Winnipeg, Montreal, Regina, Port Arthur.
Cottons	Quebec.
Steel works	Sydney, Sault St. Marie, Port Arthur.
Sugar refining	Montreal.

As far as you can, account for the location of each of the above industries.

Transport and Communications

31. The cheapest form of transport is transport by water. Canada possesses a wonderful system of waterways, but unfortunately all of her best waterways are closed by ice for at least five months of the year.

The best inland waterways—

(*a*) Are free from falls and rapids and shifting sandbanks;

(*b*) Are deep and broad at all seasons;

(*c*) Are more or less straight;

(*d*) Are not subject to floods, drought, or frost;

(*e*) Penetrate into the heart of a country;

(*f*) Pass through a fertile and productive region;

(*g*) Flow towards the great markets.

Discuss comparatively the Fraser, Nelson, Mackenzie, and St. Lawrence Rivers as lines of communication.

32. Draw a full-page map of the St. Lawrence basin, and mark upon it the following canals: Rideau, Welland, Soo, Richelieu-Hudson, Erie (see Fig. 7).

33. It is proposed to construct a ship canal from Georgian Bay to Montreal by way of Lake Nipissing and the Ottawa River. By how many miles would this route shorten the existing water route from Port Arthur to Montreal?

34. The development of the interior of Canada, however, would have been impossible without railways. It was the Canadian Pacific Railway that led to the settlement of the interior. To-day three great railways cross Canada from east to west. Draw a full-page map of Canada to show the transcontinental routes (see Figs. 4, 5, and 7). Describe a journey from the Altantic Ocean to the Pacific coast along one of these routes.

35. The transport problems of the interior of Canada cannot be understood without consulting the globe. With the help of the globe and your atlas, find roughly the distance from Saskatoon to Liverpool (*a*) via Hudson Bay, (*b*) via the Great Lakes and the St. Lawrence.

At present the wheat of the prairies is exported from Montreal and Vancouver. With the opening of the Hudson Bay Railway, Port Nelson will become an Atlantic port for about four months of the year. What physical difficulties will ships encounter in passing from Port Nelson to the Atlantic Ocean?

36. On a sketch map of Canada shade those parts of the wheat lands which are nearer to Port Nelson than to Port Arthur. Mark on this map the Hudson Bay Railway. Show its connections with Saskatoon, Winnipeg, and Edmonton.

F. 37. Translate:

Entre les Grands Lacs et l'embouchure du Saint-Laurent s'allongent des plaines, qui sont couvertes de riches alluvions. Leur climat, quoique assez rude, est pourtant plus maritime, plus humide et plus doux que celui des plaines agricoles du Centre. La ligne du Saint-Laurent est une voie de communication assez commode, créée par la nature. Aussi le Canada oriental fut-il de bonne heure peuplé. Les premiers colons y pratiquèrent d'abord exclusivement la culture des céreales et l'élevage. La population augmentant, il a fallu faire appel à l'industrie. Tout le long de la ligne des chutes se sont installées des usines et des scieries. Aussi cette portion du Canada possède-t-elle plus des deux tiers de sa population et les plus grandes villes du pays s'y trouvent. Ajoutez à ces avantages la vaste étendue navigable des Grands Lacs. Par malheur pour la navigation la région que le Saint-Laurent traverse est soumise à un climat très rigoureux pendant l'hiver. À

Montreal le Saint-Laurent est pris par les glaces pendant 120 jours en moyenne par année.

Trade

38. You have seen that certain parts of Canada specialise in the production of a few commodities rather than attempt to produce a large number of articles on a small scale. Explain (*a*) why large-scale production is economical, (*b*) how world commerce has made specialisation possible.

Hy. 39. Compare the character of the trade of the Middle Ages with that of the present day, pointing out the effect upon trade of (*a*) the discovery of new lands, (*b*) new and improved methods of production and transportation.

40. Within recent years the world's trade in perishable foods has increased enormously. What inventions have made such trade possible? How have these inventions affected the industries and trade of the Argentine, Australia, and New Zealand?

E. 41. "Industry, commerce, and invention are interwoven." Write an essay on this subject.

42. The external trade of Canada is shown by the following figures:

1921–1922.	Imports £150 million.	Exports £148 million.
	Percentage of total.	Percentage of total.
Vegetable products (except chemicals, fibres, and wood)	43	23
Animals and their products (except chemicals and fibres)	19	5
Fibres, textiles, and textile products	·5	20
Wood, wood products, and paper	24	5
Iron and its products	4	15
Non-ferrous metals and their products	4	4
Non-metallic minerals and their products (except chemicals)	3	19
Chemicals and allied products	1	3
All other commodities	1·5	6

Draw diagrams to represent the facts contained in the above table and state carefully all the conclusions you draw from an examination of the diagrams.

43. What conclusions do you draw from the following figures as to the industries of Newfoundland:

Exports of Newfoundland

	Percentage of total value.		Percentage of total value.
Dried Cod	55·6	Herring	2·8
Paper	10·2	Sealskin	2·4
Iron ore	9·4	Copper ore	1·3
Tinned lobster	3·3	Seal Oil	2·3
Cod oil	2·1	All others	10·6

44. Explain as fully as you can the facts which account for the figures shown in the following diagrams (Figs. 62 and 63):

Canadian Exports and Imports

Fig. 62.

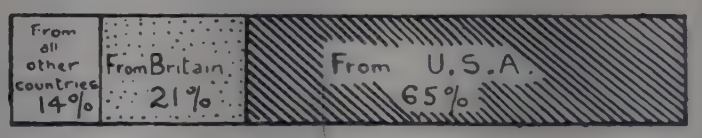


Fig. 63.

Population

45. At the census of 1921 the population of Canada was 8,787,998, distributed as follows

Provinces and capitals.	Population.
Alberta (Edmonton)	588,454
British Columbia (Victoria)	524,582
Manitoba (Winnipeg)	610,118
New Brunswick (Fredericton)	387,876
Nova Scotia (Halifax)	523,837
Ontario (Toronto)	2,933,662
Prince Edward Island (Charlottetown)	88,615
Quebec (Quebec)	2,361,199
Saskatchewan (Regina)	757,510
Yukon (Dawson)	4,157
North-West Territories (Ottawa)	7,988

Express the above figures as percentages of the total population, and represent your results graphically.

The population of Newfoundland in 1921 was 259,317, and of the Labrador Coast 3,621. Draw a diagram to the same scale to represent the population of Newfoundland.

46. Examine the population map (Fig. 39). Describe and account for the present distribution of population in Canada and Newfoundland.

47. The following is a complete list of the towns which had more than 40,000 inhabitants in 1921. The population in 1871 is also given.

Town.	1921.	1871.
Montreal . . .	618,000	115,000
Toronto . . .	521,893	59,000
Winnipeg . . .	179,217	241
Vancouver . . .	117,217	—
Ottawa . . .	107,845	24,121
Quebec . . .	95,193	59,699
Calgary . . .	63,305	—
London . . .	60,959	18,000
Edmonton . . .	58,821	—
Halifax . . .	58,372	29,582
St. John . . .	47,166	41,325

Which of the above towns have more than trebled their populations since 1871? Analyse carefully the sites of the towns you name so as to bring out the geographical facts which account for the position and the rapid development of each of them.

Draw sketch maps to show the facts mentioned in your answers.

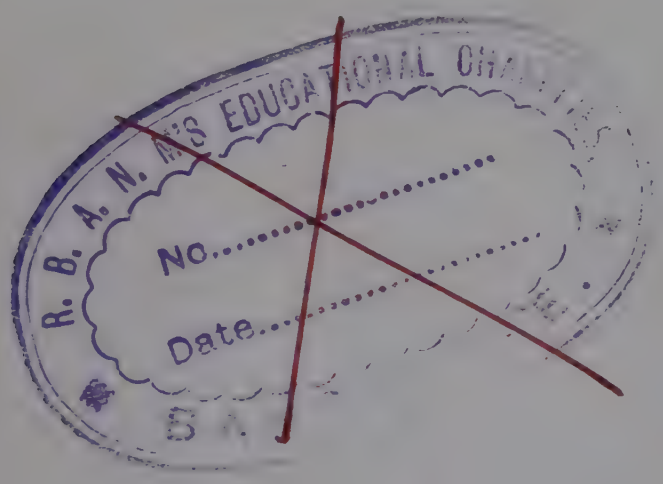
48. Account for the fact that the development of St. John, Halifax, and Quebec has been comparatively slow. Explain why Montreal is a more important port than any of these towns.

Hy. 49. What is meant by the Dominion of Canada? Trace the steps by which the Dominion has been formed.

50. Describe the course of the southern boundary of Canada.

E. 51. Write an essay on "The Future of Canada." Refer to (*a*) the vast forest resources, (*b*) the millions of acres of agricultural land ready for occupation, (*c*) the water-power and mineral resources, (*d*) the invigorating climate, (*e*) the world position of the country.

52. Summarise the geography of (*a*) Newfoundland, (*b*) Maritime Provinces, (*c*) Laurentian Provinces, (*d*) Prairie Provinces, (*e*) British Columbia.



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CHAPTER VIII

UNITED STATES

INDUSTRIES, COMMERCE, POPULATION

1. THE United States, with its 110 million inhabitants, illustrates, on a much larger scale, the different stages in the development of a new country, colonised by people who have all the resources of civilisation at their command.

Fishing

Examine Fig. 64. Name the chief fishing States. Explain why fishing is more important in New England than in any other part of the country.

2. Mark on a sketch map the following facts :

(*a*) Oyster beds are found in the numerous bays between Cape Hatteras and Cape Cod.

(*b*) Sponges are cultivated in the warm waters round Florida Straits.

(*c*) Sealing is important in the Behring Sea, off Pribilof Island.

(*d*) Salmon are caught in large quantities in the Columbia River and in the rivers of Alaska.

(*e*) Gloucester and Boston are the chief fishing ports of New England.

Lumbering

3. Almost one half of the United States was originally forested, but only one fourth of the original forests now remain. In Fig. 76 the States are divided into groups. Draw a diagram to show what percentage of the total output of timber is produced in each group of States (see Fig. 70). Which are the most important timber-producing regions ?

Note.—The yellow pine of Georgia is resinous, and turpentine and resin are important products of the forests of the coastal plain of the South Atlantic States.

Pastoral

4. Revise thoroughly question 13, Chapter VII.

5. Examine Fig. 68. Shade in pencil the States which support more than 4 per cent. of the total number of sheep found in the United States. Explain fully the different conditions which account for the present distribution of sheep in the country.

6. Apply the first part of question 5 to Figs. 65 to 69 and the latter part to cattle, horses, and pigs respectively.

Agriculture

7. The importance of agriculture in the United States may be judged from the following table, which gives, in parallel columns, the TOTAL area of England, Wales, and Scotland. and the area devoted in 1921 in the United States to some of the leading crops :

GREAT BRITAIN.		UNITED STATES.	
Country.	Total area millions of acres.	Crop.	Millions of acres.
England . .	32·4	Maize .	108·9
Wales . . .	4·7	Hay .	72·3
England and Wales	37·1	Wheat .	56·7
Scotland . .	19·0	Oats .	44·8
Great Britain .	56·2	Cotton .	26·5

On squared paper draw suitable rectangles to represent comparatively the area of England and Wales and the area devoted to each of the crops named in the table.

8. Draw up a table showing in which parts of the southern continents the following crops are grown, and revise the facts given below, which set out the conditions determining the cultivation of each crop :

Cotton

Cotton requires seven months free from frost, uniform heat without being excessive,

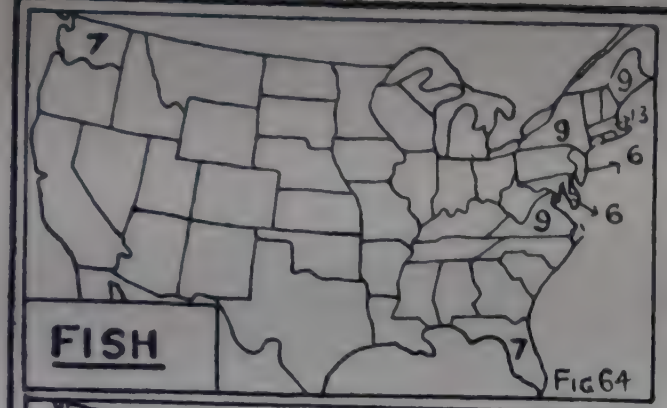


Fig 64

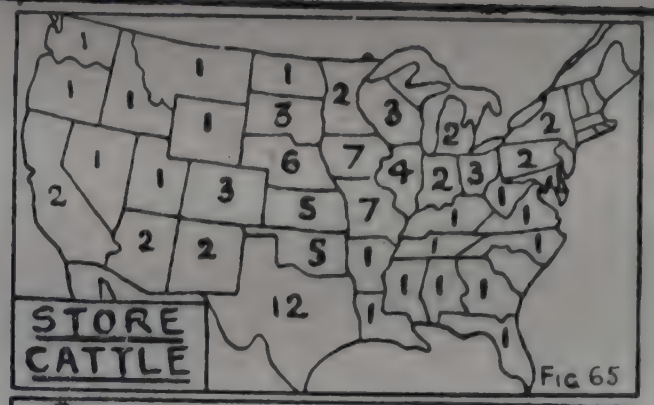


Fig 65

Fig 66

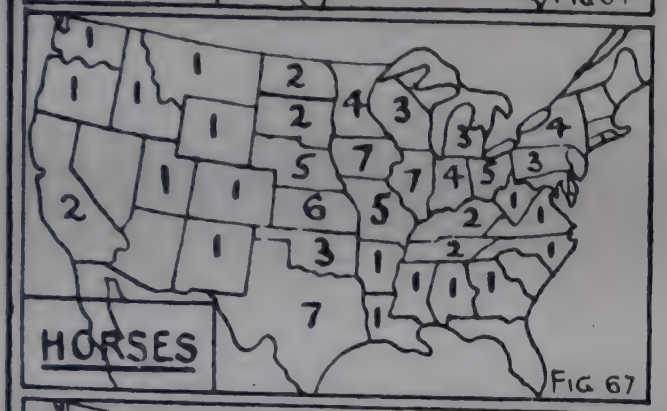


Fig 67

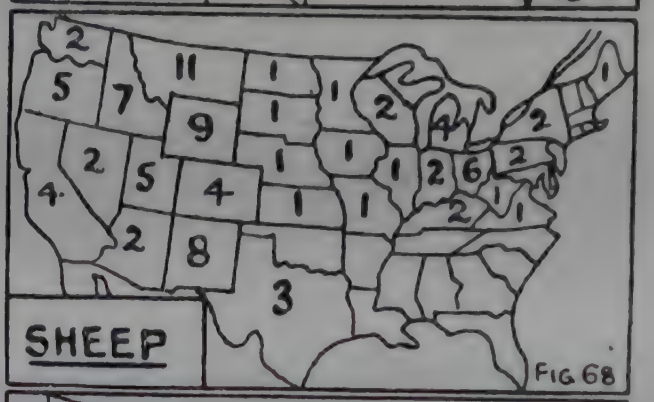


Fig 68

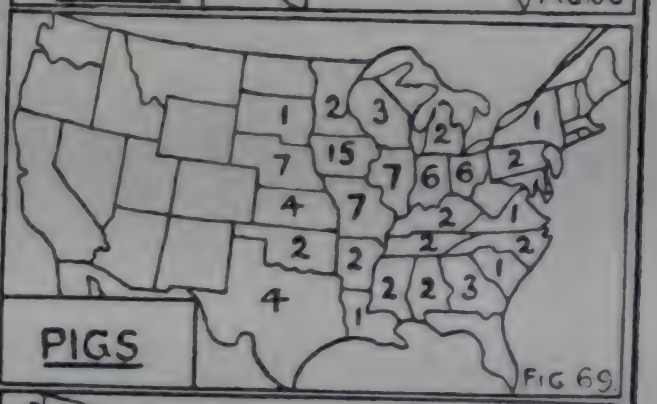


Fig 69

Fig 70

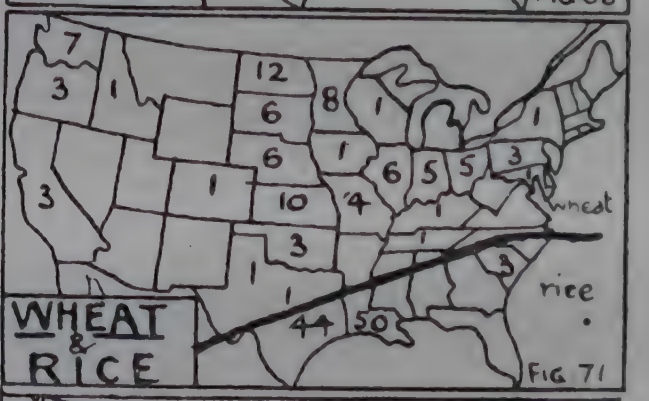


Fig 71

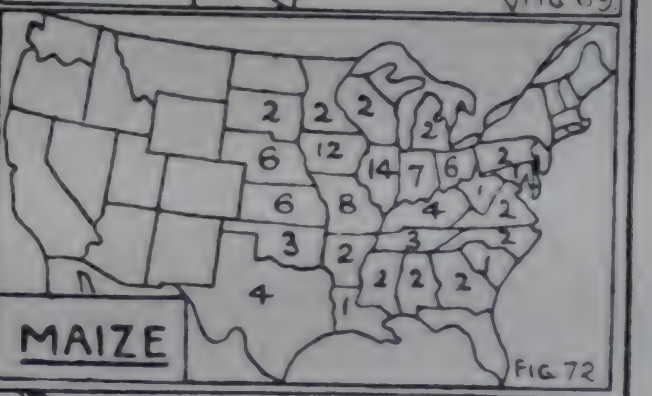


Fig 72

Fig 73

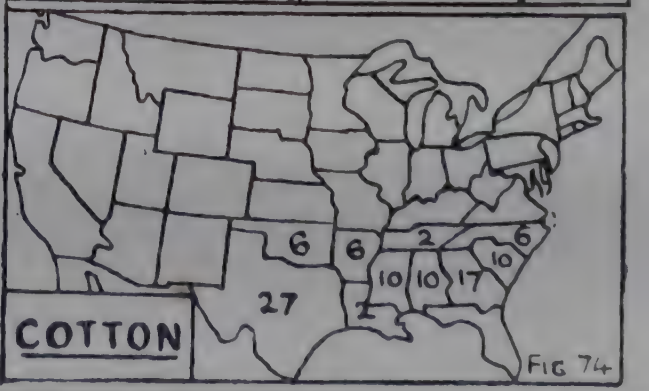


Fig 74

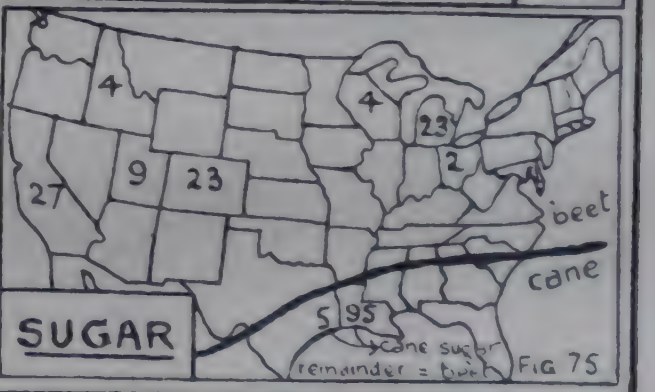


Fig 75

bright sunshine, good but not excessive summer rainfall. As picking is done by hand, and as several pickings are necessary, the cultivation of cotton demands a large amount of labour.

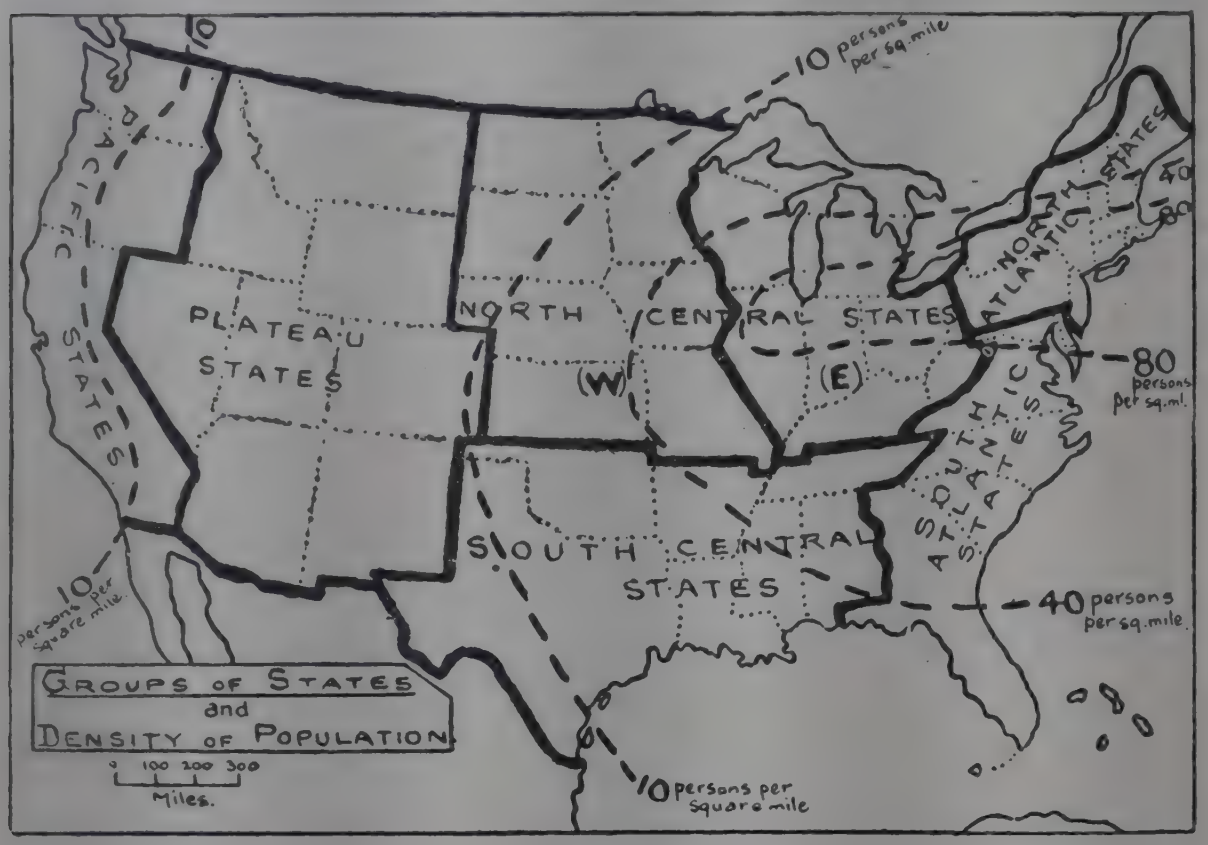


FIG. 76.

Rice

Rice requires hot and wet summers. The plant must be kept standing in water during a large part of its growing period, but the water must not be allowed to become stagnant. As the plant ripens, the water must be drawn off. Lands best suited for rice are, therefore, the flood plains and deltas of large rivers. The cultivation of rice demands a large amount of labour.

Sugar-cane

The sugar-cane requires a high temperature, much sunshine, a heavy rainfall, moist ground, and a rich soil. It grows best on land not too far from the sea.

Citrus Fruits

The citrus fruits—oranges, lemons, and limes—demand hot summers, and the winter temperature must never fall below 40° F. They are largely grown in sub-tropical climates.

9. It must be remembered that climate and surface features determine only what crops may be cultivated in a given region. Which, if any, of the crops suited to a particular region are actually cultivated there, depends upon other factors, the chief of which are:

(*a*) The market value of the different crops possible to the region. (A farmer specialises in the product which pays him best.)

(*b*) Facilities for transporting the product to the market. (Certain products demand special means of transport.)

(*c*) Suitable labour supply.

Give examples from the southern continents to illustrate the importance of each of the above factors.

10. You should now experience little difficulty in accounting for the distribution of the chief crops of the United States.

Revise thoroughly (*a*) the section of your answer to question 8, Chapter V, which deals with the United States; (*b*) question 20, Chapter VII.

11. Examine Fig. 71. Shade those States which produce more than 6 per cent. of the wheat produced in the United States.

12. Describe the situation of the chief wheat-growing regions of the United States, and explain fully the different conditions which favour the cultivation of wheat in the regions you name.

13. Apply question 11 to Figs. 71 to 75, and question 12 to maize, rice, tobacco, cotton, and sugar-cane.

Note.—In the United States machinery largely supplements human labour in the cultivation of rice.

F. 14. Translate:

Le maïs était la céréale la mieux appropriée aux besoins d'une culture extensive, comme l'était celle des premiers colons. Il n'exige pas de labours profonds, produit plus de grains que le blé: ses feuilles et ses tiges sont un bon aliment pour le bétail. Ces avantages n'ont pas cessé d'etre utilisés. Le maïs fournit le fourrage vert ou sec le plus estimé. C'est lui qui, dans la région des lacs et dans l'ouest, favorise l'engraissement du bœuf et du porc, et entretient ainsi la plus florissante des industries

américaines, celle de la viande. L'homme en fait du pain, une bouillie, le *hominy*, qui est comme un aliment national : les épis, bouillis avant maturité, sont un légume recherché. Malgré l'énormité de la production, le maïs est presque entièrement consommé dans le pays.

***15.** Explain the difference between upland and sea-island cotton. Describe a cotton plantation and write an account of the cotton-growing industry.

16. Fig. 77 shows some of the irrigation projects of the United States. Where are they situated? Describe one of these projects. What are the chief crops grown on the irrigated lands of the Plateau States? Explain why alfalfa is one of these crops.

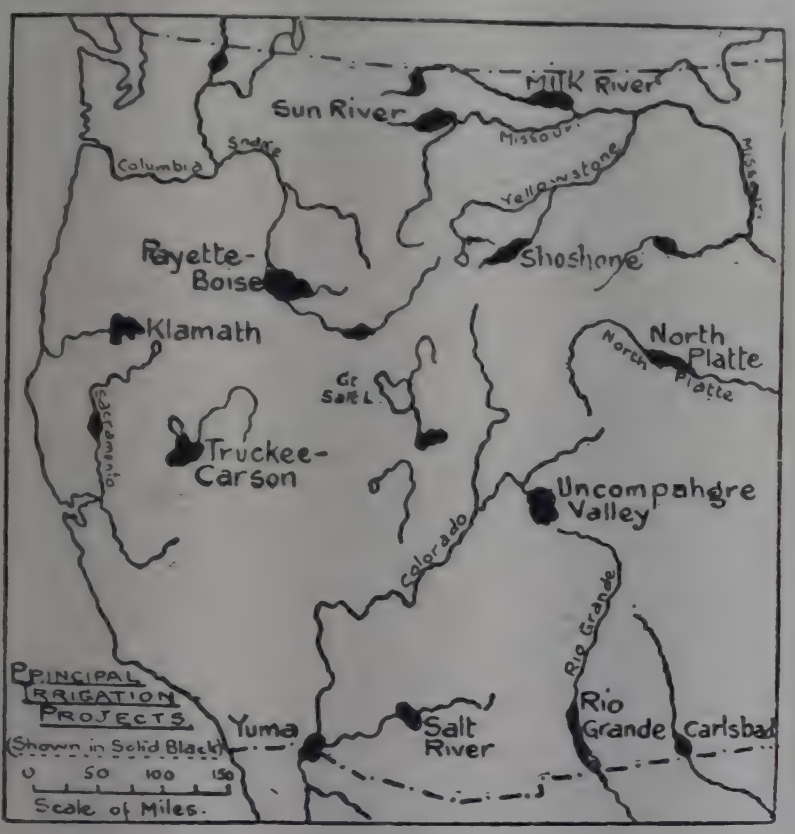


FIG. 77.

17. Systematic irrigation was first practised near Salt Lake City, on the alluvial fans at the base of the Wasatch Mountains. Describe the physical conditions which make irrigation possible in this region. In what other parts of the United States is irrigation carried on under similar conditions?

***18.** What is meant by **dry farming?** In which parts of North America is this method of farming practised?

19. Examine Fig. 75. Name the States which yield more than 4 per cent. of sugar beets produced in the country. If you refer to Figs. 25 and 66 you should be able to explain why Michigan and Wisconsin are important producers of sugar beets

20. California produces immense quantities of plums, pears, apricots, peaches, walnuts, almonds, figs, oranges, and lemons. Explain fully all the conditions which have caused this State to specialise in the production of fruit.

21. Mark the following fruit-growing regions on a map of the United States :

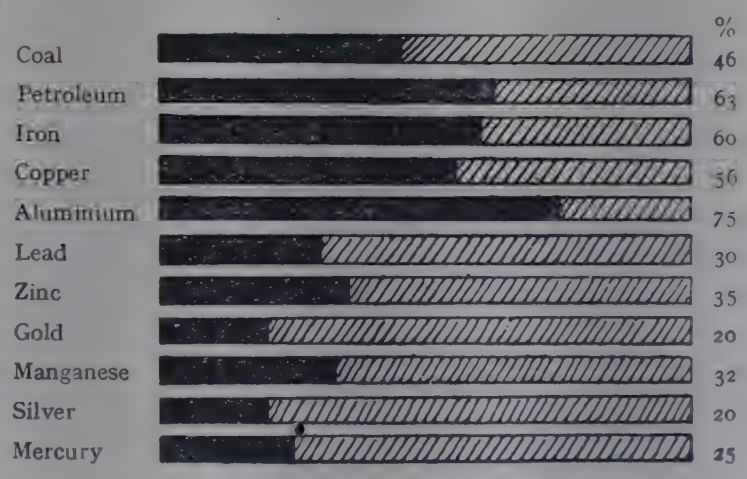
Apples .	Washington, Oregon, the States bordering the Great Lakes.
Grapes .	California, Southern shores of Lake Erie.
Oranges .	California, Florida.

MINING

22. "The rapid development of the United States is largely due to the fact that enormous supplies of easily-worked coal and iron were found in Pennsylvania." Comment upon this statement.

23. No country in the world possesses such a variety of minerals in such abundance as the United States. The only mineral of importance which is not found there is tin. It has been estimated that the value of the mineral output is equal to that of all other countries combined.

Examine Fig. 78 and state clearly what the diagram tells you of the mineral output of the United States.



PERCENTAGES OF WORLD PRODUCTION.

FIG. 78.

24. Mark on a full-page map of the United States the particulars contained in the following table, and construct diagrams to show the relative importance of coal, iron, petroleum, and natural gas in the States named in the following table. (The figures in brackets are percentages of the total output) :

Coal	Pennsylvania (47), West Virginia (11), Illinois (10), Ohio (6), Indiana (3), Kentucky (3), Alabama (3), Colorado (2).
Iron	Near Lake Superior in Minnesota, Wisconsin, and Michigan (85), Alabama, New York.
Copper	Montana, Arizona, shores of Lake Superior in Michigan.
Lead, Zinc	Missouri, Oklahoma, Wisconsin, Idaho.
Silver	Montana, Idaho, Utah, Colorado.
Gold	Colorado, California.
Petroleum	Oklahoma (23), California (23), Texas (21), Kansas (9), Wyoming (4), Illinois (3), Pennsylvania (2), Ohio (2), West Virginia (2), Kentucky (2).
Natural gas	West Virginia (36), Pennsylvania (17), Oklahoma (17), Ohio (8), California (5), Louisiana (5), Texas (2).

Manufacturing

25. The United States is the chief manufacturing nation in the world, and 95 per cent. of her manufactures are consumed at home. Account for the rapid rise of the United States as a manufacturing country.

26. In discussing the manufacturing industries of Canada, Australia, and the Home region we discovered that the location of the centres at which the several industries were carried on was largely determined by its position with respect to (*a*) the particular kind of raw material used, (*b*) the source of power, (*c*) facilities for disposing of the manufactured products, (*d*) labour supply.

Discuss the relative importance of each of the above factors in the case of each of the following industries: Saw-milling, smelting iron ore, flour-milling, butter and cheese-making, canning and preserving fish, fruit and meat, making of agricultural and textile machinery, textiles and hardware.

27. Express the facts contained in the subjoined table in the form of diagrams, and as far as you can account for the location of the industries named. (The figures represent percentages of the total output):

Canning and preserving fruit and vegetables	California (50), Maryland (15), New York (12), New Jersey (10).
Leather	Pennsylvania (27), Massachusetts (14), Wisconsin (13), New York (12), New Jersey (9), Michigan (8), Illinois (6).
Butter and cheese	Wisconsin (18), Minnesota (18), Iowa (16), California (10), Ohio (8), Michigan (7).
Meat and meat products	Illinois (38), Kansas (12), New York (11), Nebraska (8), Missouri (7), Iowa (6).
Woollen goods	Massachusetts (35), Connecticut, Rhode Island, and New Hampshire (25), Pennsylvania (18), New Jersey (10).
Cotton goods	Massachusetts (38), Connecticut, Rhode Island, and New Hampshire (20), North Carolina (16), South Carolina (14). Georgia (10).
Iron and steel manufactures	Pennsylvania (53), Ohio (24), Illinois (8), Indiana (7), Alabama (4).
Paper	New York (21), Massachusetts (16), Maine (15), Wisconsin (11).

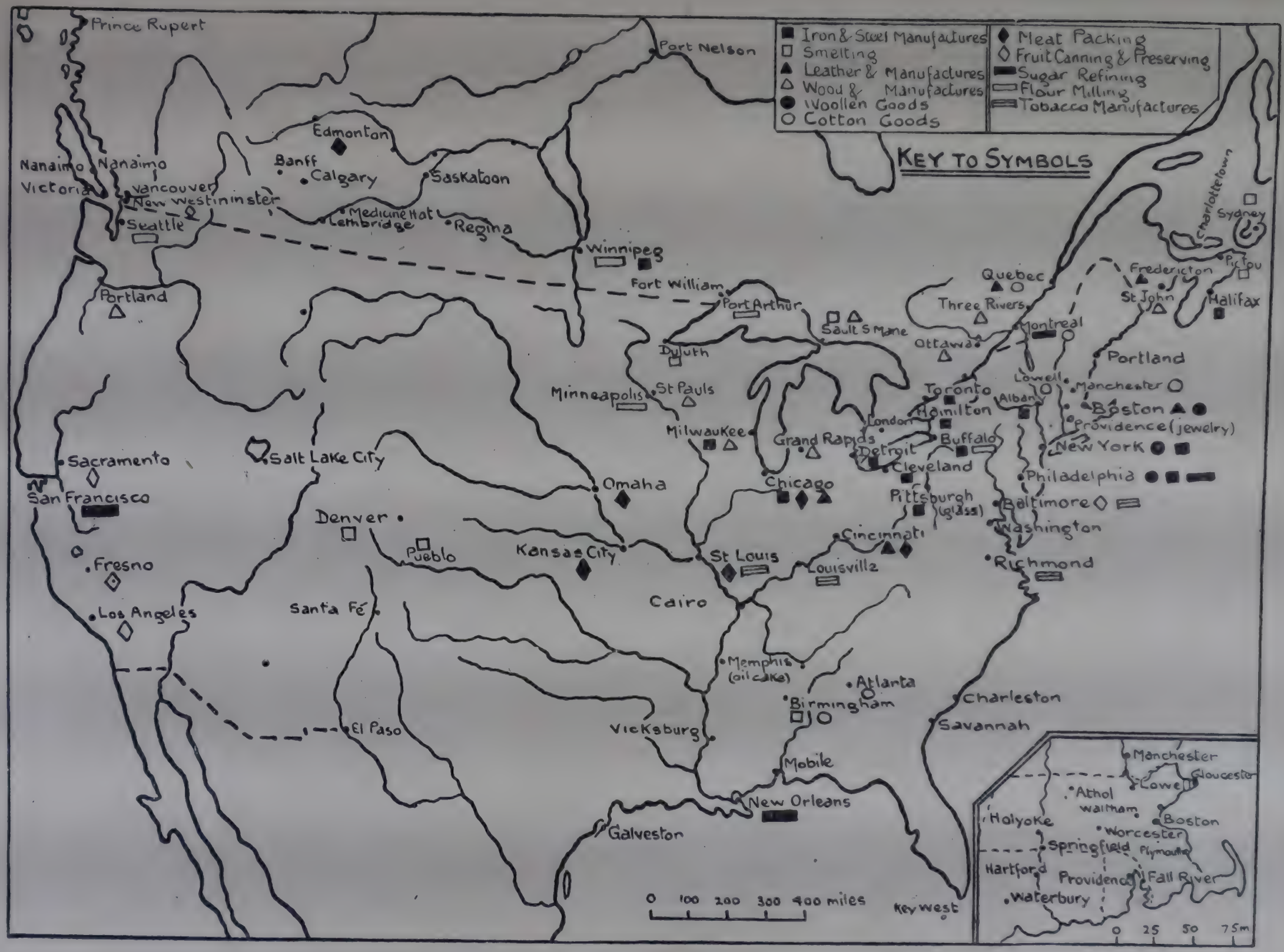
28. On a full-page map of the United States, show, by means of symbols, the chief manufacturing industries of each State named in the above table. Mark also the position of the chief towns in these States.

29. On the above map draw a continuous line to connect the following towns: Portland (Maine), Buffalo, Detroit, Chicago, St. Louis, Cincinnati, Baltimore.

The area enclosed by the line you have just drawn is the chief manufacturing region of the United States. Enumerate all the manufacturing advantages possessed by this region.

30. The chief manufacturing industries of certain of the towns marked on Fig. 79 are indicated on the map. In the case of each town, state briefly its facilities for (*a*) obtaining the necessary raw materials and power, and (*b*) disposing of the finished product.

31. What is the "Fall Line"? Point out its importance with regard to the manufacturing industries of the South Atlantic States. Draw a sketch map to show its position and the chief towns which are situated on it.


Iron & Steel Manufactures
Smelting
Leather & Manufactures
Wood & Manufactures
Woollen Goods
Cotton Goods
Meat Packing
Fruit Canning & Preserving
Sugar Refining
Flour Milling
Tobacco Manufactures
KEY TO SYMBOLS
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Port Nelson
Edmonton
Banff
Calgary
Saskatoon
Nanaimo
Nanaimo
Victoria
Vancouver
New Westminster
Seattle
Medicine Hat
Lethbridge
Regina
Winnipeg
Fort William
Port Arthur
Portland
Sault S Marie
Duluth
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Manchester
Lowell
Gloucester
Athol
Waltham
Holyoke
Worcester
Boston
Springfield
Plymouth
Hartford
Providence
Fall River
Waterbury
0 25 50 75m

FIG. 79.

Communications

32. Before the advent of railways civilised man in America clung to the waterways, and settlement was, for the most part, confined to the Atlantic coastal plain, to the neighbourhood of the Great Lakes, and to the banks of the Hudson, Ohio, and Mississippi Rivers.

Revise question 31, Chapter VII, and discuss the advantages and disadvantages of the Mississippi as a commercial waterway. How has its value been affected by railway development ?

33. Explain the relation between the physical features and the absence of important waterways in the western half of the United States.

34. Where are the following canals: Soo, Erie, Champlain ? Discuss the importance of each.

35. Although the progress of the United States is, in a large measure, due to her excellent system of waterways, it is her railways which have enabled her to become one of the greatest producers of foodstuffs, raw materials, and minerals. In 1830 the United States had only 23 miles of railways; to-day it has more than two-thirds of the world's total mileage. A railway map of the manufacturing region, referred to in question 29, resembles a spider's web, so well served is this region by railways (Fig. 80). The most important long-distance and transcontinental routes are shown on Figs. 5 and 7.

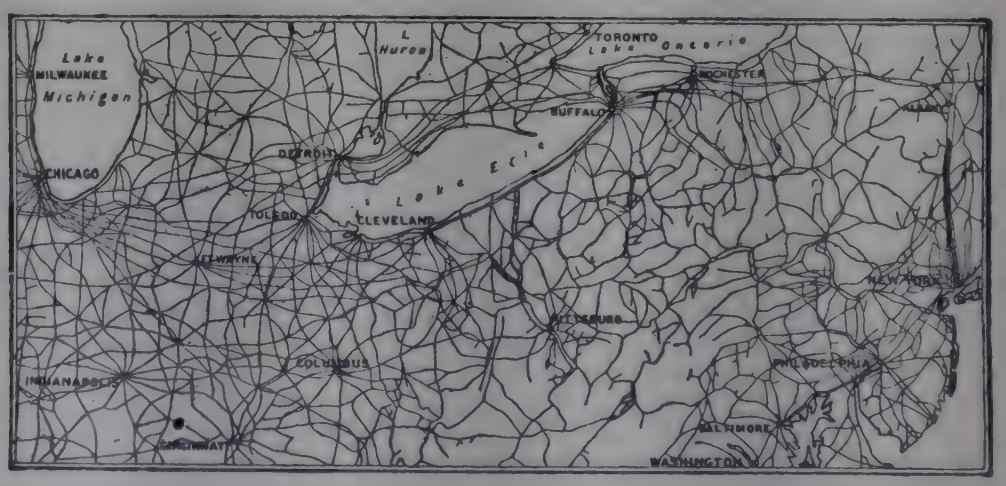

FIG. 80.

Note particularly the following routes:

(*a*) New York—Albany—Buffalo—Cleveland—Toledo—Chicago—Minneapolis—Seattle.

(*b*) Philadelphia — Pittsburg — Chicago — Omaha — Salt Lake City — San Francisco.

(*c*) Baltimore — Cincinnati — St. Louis — Kansas City— Santa Fé—San Francisco.

(*d*) New York — Washington — Atlanta — New Orleans — Houston — Galveston — Los Angeles—San Francisco.

(*e*) Chicago — Cairo — Memphis — New Orleans.

36. Write brief notes on the scenery and occupations of the peoples of the regions passed through on a journey by rail from Chicago to San Francisco.

F. 37. Translate:

Le peuplement de l'intérieur et de la région Pacifique des États-Unis n'a pu se faire qu'à partir du temps et dans la mesure où ces régions se sont trouvées reliées par des voies de communication commodes avec l'Atlantique par où arrivaient les émigrants.

Les voies navigables sont abondantes. Le réseau du Mississippi sert surtout aux relations entre nord et sud. Plus de 8,000 navires passent, chaque année, de l'embouchure du Mississippi au confluent de l'Ohio et du Mississippi. Mais le Mississippi ne peut guère servir aux relations entre le Centre et l'Atlantique.

Les Grands Lacs forment une mer intérieure navigable pendant 250 jours. Ils constituent une excellente voie commerciale. Unissant les deux régions des Etats-Unis les plus riches et les plus peuplées, cette mer intérieure suscite une navigation intense: chaque année, du lac Huron au lac Erie il passe cinq fois plus de navires que par le canal de Suez.

Cependant les voies ferrées ont été le meilleur instrument pour le peuplement de l'intérieur. La pénétration par les Grands Lacs se limite au Centre-Nord: le réseau du Mississippi est orienté du Nord au Sud et n'a servi qu'à établir des relations entre la zone atlantique et la zone tropicale. Le peuplement du " Far West " n'a commencé qu'après 1870, après l'achèvement du premier transcontinental.

38. Explain why the Hudson-Mohawk route is the most important of all the routes between the Atlantic coast and the Central Plains.

***39.** Write notes on (*a*) the railway from Miami (Florida) to Key West, (*b*) the railway from Skagway to the Yukon basin.

40. Draw a full-page map of the United States to show the States grouped as in Fig. 76. Mark on this map the chief commercial products of each group of States. With the help of your map name the chief articles of trade between the North Atlantic States and (*a*) the Gulf States, (*b*) the Pacific States, (*c*) the Central States.

41. More than 60 million tons of freight passes annually through the "Soo" canals. Of what would the bulk of (*a*) the east-bound, (*b*) the west-bound cargo consist? Which would be the greater, and why?

42. Draw diagrams to represent the percentages shown in the table given below:

Imports.	Percentage of total value.	Exports.	Percentage of total value.
Textiles	11	Raw cotton	25
Silk, wool, flax	7	Grain	8
Coffee, tea, cocoa	7	Meat products	6
Metals and metal goods	5	Metals and metal goods	19
Sugar	6	Oils	3
Drugs, dyes, chemicals	5	Wood	5
Hides and skins	6	Leather	3
Rubber	6	Tobacco	2
Fruit and nuts	3	Coal	2
Wood-pulp, boards	3	Cottons	2

43. The chief ports of the United States are: New York, New Orleans, Boston, Philadelphia, Baltimore, San Francisco, and Galveston. Write brief notes on the character of the trade of each of these ports, and explain fully why New York is the largest port in America.

44. The other ports of the United States are almost entirely engaged in exporting the products of their own immediate surroundings. Name the chief exports of Portland (Maine), Seattle, Portland (Oregon), Savanna, Charleston, Mobile, and Tampa respectively.

POPULATION

45. You have already considered the factors which control the distribution and density of population. Examine Fig. 76 and show the connection between (*a*) the distribution of population and (i) physical conditions, (ii) position; (*b*) the density of population and occupations.

46. Southern New England, which possesses neither coal nor raw material, is the chief manufacturing and most densely peopled region in the United States. Carefully explain the reasons for this.

47. Account for the facts which are revealed in the following table:

State.	Population.	
	1900.	1920.
Maine	694,000	768,000
Washington	518,000	1,357,000

48. Describe the geographical conditions which determined the site of the town in which you live, and state how the later growth of the town has been helped or hindered by its situation. If any other important factors have affected its growth, name them.

49. Turn to the political map of the United States in your atlas and underline the towns which have been referred to in this chapter. If you study your maps closely you will find that all these towns occupy one or more of the undermentioned positions:

A. *River Towns.*

(*a*) Highest point reached by vessels of a certain size.
(*b*) Limit of navigation.
(*c*) Near waterfalls or rapids.
(*d*) At a confluence.
(*e*) At a marked change in the direction of a river's course.
(*f*) At a water gap.
(*g*) Where important land and water routes intersect.

B. *Coast Towns.*

(*a*) At the mouth of a river.
(*b*) At the head of an estuary or gulf.
(*c*) At a marked inward bend of the coast-line.
(*d*) On the continental side of an island near the coast.

C. *Other Towns.*

(*a*) At the foot of a pass.
(*b*) Near mines.
(*c*) At the extremity of a mountain barrier.

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Explain why each of the above positions is a suitable site for a town. (Lake towns come under A or B above.)

50. Explain carefully the geographical conditions which have decided the position and controlled the growth and importance of the following towns, each of which had, at the census of 1920, a population of over half a million: New York, Chicago, Philadelphia, Detroit, Cleveland, St. Louis, Boston, Baltimore, Pittsburg, Los Angeles, Buffalo, San Francisco. Draw sketch maps to show the facts mentioned in your answers.

51. Revise your work on the United States by writing short summaries of the physical conditions, natural resources, and occupations of each of the groups of States shown in Fig. 76.

CHAPTER IX

MEXICO, CENTRAL AMERICA, WEST INDIES

INDUSTRIES, COMMERCE, POPULATION

1. REVISE what you have learned, in the first section of this book, of the physical features, climate, natural vegetation, mineral resources, and people of Mexico and Central America.

2. Draw a full-page map of Mexico, to show the following vegetation regions: Hot wet forest, montana, savana, scrub, and desert.

3. Draw diagrams to show graphically the temperature and rainfall throughout the year at Colima, Mexico, and Vera Cruz respectively. The statistics are given in question 6, Chapter V.

4. Explain (*a*) why the east coast of Mexico is wetter than the west coast, (*b*) the rainfall on the plateau is light, (*c*) most rain falls in summer.

5. Describe the features of the Atlantic coast of Mexico and of Central America. Why is this coast so unhealthy?

6. Although Mexico is famed for its mineral wealth, most of the people are engaged in rearing animals and growing crops. Fig. 81 shows the distribution of the chief vegetable products and domestic animals. State which of these products are obtained or cultivated in the tierra caliente, the tierra templada, and the tierra fria respectively. Mark on the map which you have drawn in answer to question 2 the products of each vegetation region.

***7.** Write notes on guayule, yucca, agave, maguey, henequen, tortilla, chicle gum.

8. Examine Fig. 81 and draw up a table of the chief minerals of Mexico.

Mexico is one of the principal mining countries in the world. In the production of silver it stands at the head of the list. In the production of copper and petroleum it stands second, and for gold, fourth. Mines are to be found in nearly every State. Guanajuato, San Luis Potosi, Zacatecas, and Monterey are the chief mining centres. Durango is noted for its iron ore, while petroleum is obtained on the east coast, near Tampico.

9. Manufacturing industries are unimportant, but as there is a local demand for cotton cloth, leather goods, and tobacco, there are cotton, leather, and tobacco factories in the large towns of the south. Monterey has important steel works.

"The low standard of living, the poverty of the people, and the political unrest do not encourage manufacturing on a large scale." Comment on this statement.

10. Examine the population map (Fig. 39). Describe carefully the position of the regions of dense population and sparse population, and state how the climate of Mexico has influenced settlement.

11. The only towns of Mexico which have a population of more than 100,000 are Mexico City, Guadalajara, and Puebla. Monterey and San Luis Potosi have each a population of over 80,000. State what you have learned about each of the above towns.

12. Study the railway routes which are shown on Fig. 5. Describe a journey by rail from El Paso or from Laredo to Mexico City.

13. Name towns on the plateau which are railway centres. Describe some of the physical difficulties encountered in constructing the railway (*a*) from Tampico to San Luis Potosi, and (*b*) from Vera Cruz to Mexico City.

14. Discuss the importance of the Tehuantepec inter-oceanic railway.

15. The best harbours of Mexico are on the west coast, but Tampico and Vera Cruz are the chief ports. Account for this.

16. Most of the trade of Mexico is carried on with the United States. Draw up a table of the chief exports (see Fig. 81).

CENTRAL AMERICA

17. From the figures contained in the table below find (*a*) the density of population in Central America, (*b*) the density of population in each of the countries of Central America.

FIG. 81

Enter your results on the map drawn in answer to question 13, Chapter VI.

Country.	Area, sq. miles.	Population.
Guatemala . .	42,456	1,600,535
Nicaragua . .	51,660	638,119
Honduras . . .	44,275	662,422
British Honduras .	8,598	45,317
Salvador . . .	7,225	1,271,336
Costa Rica . .	23,000	477,892
Panama	31,890	401,428

18. Examine the population map (Fig. 39). Compare this map with the relief map. Notice that, as in Mexico, the population is concentrated on the cooler and healthier part, i.e. the plateau. Notice also that there are more people on the Pacific side than on the Atlantic side of the mountains.

Explain why (*a*) Salvador is the most densely peopled and (*b*) Honduras is the most sparsely peopled country in Central America.

19. You are now able to explain why the Pacific side of Central America is far more productive than the Atlantic side.

Draw a sketch map of Central America and mark upon it, by means of symbols, as many as possible of the following facts:

(*a*) The stable articles of food, maize and beans, are grown on the cooler plateau.

(*b*) Coffee, sugar, rice, cotton, indigo, tobacco, cacao, and rubber are grown on the Pacific plain and slopes.

(*c*) Coffee is the chief product of Guatemala and Costa Rica.

(*d*) By the enterprise of United States fruit corporations, large areas have been cleared and drained and made to grow heavy crops of bananas, which are exported from Livingston and Limon.

(*e*) British Honduras produces excellent mahogany, which is exported from Belize.

(*f*) The chief exports of Central America are: Coffee, bananas, hides, rubber, mahogany, cedar, logwood, cacao, tobacco.

20. On the sketch map which you have just drawn mark the inter-oceanic railways.

***21.** Write short notes on the Panama Canal and describe a journey from Colon to Panama. Refer to *Whitaker's Almanack* or to any other available source for information.

22. Point out the commercial importance of the Panama Canal. How will it affect the trade of Vancouver, San Francisco, Kingston (Jamaica), and Valparaiso respectively? What countries are likely to benefit most by it?

23. Write short revision notes on (*a*) the relief and structure, (*b*) the characteristic features of the climate, (*c*) the natural vegetation of the West Indies.

24. Draw a large sketch map of (*a*) the Greater Antilles, (*b*) the Lesser Antilles. With the help of your atlas state which of the Lesser Antilles are included in the "Leeward Islands" and in the "Windward Islands" respectively.

Mark on the maps, by means of symbols, as many as possible of the facts contained in the following table:

Cuba.	Cuba is a republic under United States' protection. It produces more sugar than any other country in the world. Tobacco is also an important crop. Other products are coffee, cacao, bananas, pineapples, oranges, and coco nuts. The forests yield cedar (for cigar boxes), mahogany, and logwood. The live stock includes 3,000,000 cattle and 600,000 horses, reared on the central uplands. Iron ore is mined in the eastern mountains. Havana, the capital, is the centre of trade. It has a population of over half a million.
Haiti or Hispaniola.	Haiti consists of two independent negro republics, Haiti and San Domingo. Revolutions have prevented development, and this island is the most backward of all the West Indies. Cotton, rice, maize, tobacco, and cocoa are grown.
Porto Rico.	Porto Rico, a United States possession, is the most densely peopled island. Its products are similar to those of Cuba. Most of its trade is with the United States.
Jamaica.	The Blue Mountains, extending across the island from east to west, reach a height of over 7,000 ft. The chief products may be judged from the following list of exports: Fruit (50 per cent.), sugar (10 per cent.), coffee, cacas, logwood, and ginger. Kingston, the capital, has a population of 67,000.
Bahamas.	These coral islands are not fertile. Henequen and pineapples are grown. Sponges are obtained from the warm waters which surround the island. Nassau, the capital, is a health resort. Columbus landed in Watling Island in 1492.
Trinidad.	Trinidad produces chiefly cacao, petroleum, asphalt, and sugar. The asphalt lake, 110 acres in extent, is apparently inexhaustible.
Barbados.	The chief product of Barbados is sugar. Cotton is also an important crop.
Windward Islands.	Grenada, St. Vincent, and St. Lucia produce sugar, cacao, and cotton chiefly. Martinique belongs to France. St. Vincent and Martinique suffered from a great volcanic eruption in 1902.
Leeward Islands.	Most of these islands are British, and their products are similar to those of the Windward Islands. The island of St. Thomas, in the Virgin Islands, belongs to the United States, and Guadeloupe belongs to France.
Bermudas	The Bermudas are a coral group of islands situated in 32° N. lat., and about 600 miles from the coast of the United States. There are no streams or wells, and the inhabitants depend on the rainfall stored and preserved in tanks. Out of a population of 21,000, only 7,000 are white. Early vegetables and flowers are produced for the New York market. The islands are an important British naval station.

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